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The Netherlands

Engaging with new knowledge in Low Countries' Chronicles (1500-1850)

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Citation

Dekker, T. M. A. M. (2024, November 27). *Engaging with new knowledge in Low Countries' Chronicles (1500-1850)*. Retrieved from <https://hdl.handle.net/1887/4170014>

Version: Publisher's Version

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Note: To cite this publication please use the final published version (if applicable).

Chapter 3

Explaining Epidemics. Combining New and Traditional Knowledge

Uncleanliness or unhealthy air do not necessarily cause cholera. The disease could also be triggered by other factors which are not yet known to us

- Chronicler Edouard Callion (1832), Ghent.¹

¹ '[Men heeft aldaer iets zeldzaam opgemerkt, het welk bewyst dat het] niet altyd onreynigheyd of ongezonde lucht is die den Cholera veroorzaekt; maer dat de ziekte aen oorzaken moet toegeschreven worden, die tot hier toe onbekend zyn.' Edouard Callion, 'Gentsche kronijke: 1525-1835', vol. 6., Universiteitsbibliotheek Gent, Boekentoren, BIB.G.014248, 499.

Introduction

In the previous chapter, we observed a shift in the explanations for meteorological phenomena. The role of the divine changed: an active deity became more passive. We determined that this transition depended on the accessibility of new knowledge to explain the phenomenon. Comets and solar eclipses could be explained through natural processes earlier than earthquakes and abnormal seasons. Divine explanations moved to the background when they were no longer necessary to describe the phenomenon, allowing contemporaries to no longer fear, for example, lightning as a punishment from God, but rather to see it as a result of His natural laws.

Mokyr would describe this as a process of knowledge becoming increasingly 'tight'. Computation, formal methods and instruments increased the tightness of knowledge, meaning that what was known became more certain, leaving less, or little, room for alternative explanations.² Knowledge of phenomena which was 'untight' meant that there were various explanations, but that the evidence to support the explanations was limited. This means that for a specific phenomenon there might exist a wide range of incompatible ideas that cannot be resolved, and this leaves matters unsettled until a more effective method of testing the competing views is found, according to Mokyr.³

In the previous chapter, we have seen that with regard to comets, and lightning in combination with the conductor, that knowledge went – using Mokyr's terms – from 'untight' to 'tight'. Once comets could be predicted, and contemporaries understood that lightning was a form of electricity, the phenomena moved from the 'preternatural' to the 'natural' domain. Yet, there are also phenomena where knowledge became increasingly 'tight' but (initially) did not do so at the expense of traditional explanations. In the minds of contemporaries, such explanations were not 'incompatible'. They could exist side-by-side, or even complement each other. How traditional and new explanations related to each other in the process of knowledge that became increasingly 'tight' will be illustrated through the chroniclers' reflections on epidemics. It is a phenomenon that almost every early modern generation experienced. However, while various new explanations emerged, it remained difficult for contemporaries to grasp the origin and spread of epidemics, making it a suitable topic to examine the relationship between traditional and new as well as 'tight' and 'untight' explanations.

The aim of this chapter is twofold. Firstly, it will show that different explanations for phenomena, such as epidemics, could develop and coexist, without contemporaries believing them to be incompatible. Second, to continue what we started in the previous chapter, we will identify the conditions for the acceptance of new knowledge. For the first objective, this chapter builds on observations made by the sociologist Ann Swidler

² Mokyr, *A Culture of Growth*, 45, 279.

³ Ibid., 45.

(2001), who argued that people's systems of belief are much more disjointed and less seamless than previously thought. In fact, people usually operate in several cultural systems at once, in which contradictions and inconsistencies cause no difficulty.⁴ That this was also the case in the early modern period has been examined by Judith Pollmann. In her book *Memory in Early Modern Europe* (2017) she called attention to the fact that when it came to understanding the past, new explanations did not necessarily replace old ones but could coexist alongside them.⁵ In this chapter, we will examine to what extent this also applied when chroniclers reflected upon epidemics.

The wide variety of explanations is particularly evident in phenomena whose causes and characteristics are difficult to verify empirically. For example, epidemics were interpreted as a punishment from God, but simultaneously, every effort was made to prevent their origin and spread with both religious and secular measures. A 'modern' explanation for epidemics did not emerge in the early modern period, although we do see new explanations arise, disappear, and integrate into existing ones.⁶ By studying this process in detail, we can build on and extend the conclusion of *Chapter 2*, to demonstrate first, that new explanations of one phenomenon did not result in doubts about explanations of another phenomenon. Secondly, we will see that chroniclers used various explanations side-by-side to make sense of and to cope with the phenomena that they experienced.

Research into how non-experts experienced epidemics has attracted attention from historians since the 1980s. Initially, research focussed mainly on medical practitioners, resulting in a progressive narrative from Hippocratic and Galenic medicine to the corpuscular theory of Girolamo Fracastoro (c.1476-1553), and finally the 'modern' germ theory of disease, stimulated by Edward Jenner's invention of vaccination.⁷ In 1989, the medical historian Charles E. Rosenberg called attention to the importance of studying the individual experience of diseases in both time and space, as well as how culture shapes the way we define diseases and, how diseases influence the creation of culture.⁸ From then on, a growing number of historians have extended their inquiries beyond medical policies and theories to include the reconstruction of an epidemic's impact on the everyday lives of ordinary individuals.⁹ By using various historical sources, such as diaries and judicial records, historians have shifted their focus from the literate elite –

4 Swidler, *Talk of Love*, 94.

5 Pollmann, *Memory in Early Modern Europe*, 2, 196–97.

6 The 'modern' theory of disease is the germ theory of disease. The idea that pathogens or 'germs' can cause disease.

7 For a recent overview see: John Henderson, *Florence Under Siege: Surviving Plague in an Early Modern City* (Yale, 2019); Samuel K. Cohn, *Epidemics: Hate and Compassion from the Plague of Athens to Aids* (Oxford, 2018); Mary Lindemann, *Medicine and Society in Early Modern Europe* (Cambridge, 2010).

8 C. E. Rosenberg, 'Disease in History: Frames and Framers', *The Milbank Quarterly* 67 (1989): 14.

9 *The Routledge History of Disease* (Routledge Handbooks Online, 2016), 4–5.

composed of governing classes, medical experts, and the Church – to a wider societal perspective.¹⁰

A well-known example is the diary of the tanner Miquel Parets (1610–61) which was published in 1991 by James Amelang.¹¹ Written during the Barcelona plague of 1651, this diary provides an insightful and critical account of the experiences and reflections from the perspective of a middle-class craftsman during the plague. A more recent example is offered by John Henderson in 2019 who examined how various experts and non-experts in Florence experienced and coped with the epidemic plagues from 1630 to 1633.¹² Using a significant amount of non-medical writings, such as plague poetry and plague narratives, he provided an interdisciplinary account of the impact of and reactions to this epidemic from medical, social, religious and artistic perspectives.¹³

This new cultural history of epidemics has led to a more multifaceted picture of how contemporaries dealt with epidemics by examining not only secular, but also religious measures and explanations.¹⁴ The result of these approaches is the discovery of the gap between the explanations and experiences of 'experts' and 'non-experts' during epidemics. This does not mean that the explanations of non-experts lagged behind those of experts. Non-experts were not necessarily 'dragged along' as Mokyr would describe.¹⁵ Chroniclers actively gathered and produced knowledge themselves and sought patterns to explain epidemics. For this, they used knowledge from medical experts, as well as from priests or preachers. In addition, many of them conducted their own research, leading to new explanations. How chroniclers combined different forms of knowledge, how this changed over time, and what explanations they arrived at are central to this chapter.

Corpus

Because I study epidemics from the perspective of chroniclers, my definition is based on how they wrote about it using terms like a 'general mortality', or *generaele sterfte*.¹⁶ I interpret an epidemic as 'a widespread occurrence of an infectious disease within a specific time frame', which excludes chronic, occupational, or other categories of diseases.¹⁷ The reason for this choice is that epidemics, unlike other diseases, were

¹⁰ Henderson, *Florence Under Siege*, 11.

¹¹ Miquel Parets and James S. Amelang, *A Journal of the Plague Year: The Diary of the Barcelona Tanner Miquel Parets, 1651* (New York, 1991); See also: Giulia Calvi, *Histories of a Plague Year: The Social and the Imaginary in Baroque Florence*, *Studies on the History of Society and Culture* 8 (Berkeley, 1989).

¹² Henderson, *Florence Under Siege*.

¹³ *Ibid.*, 3.

¹⁴ Calvi, *Histories of a Plague Year*; John Henderson, *The Renaissance Hospital: Healing the Body and Healing the Soul* (New Haven, 2006); Carole Rawcliffe, *Medicine for the Soul: The Life, Death and Resurrection of an English Medieval Hospital* (Stroud, 1999).

¹⁵ Mokyr, *A Culture of Growth*, 120.

¹⁶ Luyten, *Kronijk uit het klooster*.

¹⁷ Rosenberg, 'Disease in History'; For more information on the definition of diseases as a social construct see: Charles E. Rosenberg, ed., 'Explaining Epidemics and Other Studies in the History of Medicine', in

generally interpreted as a collective punishment from God and were also explained by 'natural' processes. This makes it possible to study the interaction between the two ways of understanding.

To investigate this, I used a wordlist to find text fragments that concern epidemics in the same way as in the previous chapters (*Appendix 8*). I made use of 166 chronicles from the period 1500-1860, using 116 chronicles from the Northern Netherlands and 50 from the Southern Netherlands.¹⁸ I found that 71 of the chronicles in the Northern Netherlands, and 41 of those in the Southern Netherlands contained entries on epidemics, of which I studied 701 fragments in close detail.¹⁹

Epidemic Period 1500-1860	Recorded in the Chronicles	Percentage of the Total Entries
Pest(ilence)	210	30%
Rinderpest/Cattle plague	154	21%
Dysentery	46	7%
Cholera	25	4%
Other	266	38%
Total	701	100%

Table 3. Most frequent epidemics in the chronicles, 1500-1860.

The most frequently recorded epidemics in the chronicles are listed in *Table 3*. Pest(ilence) and the rinderpest represent 51 per cent of the epidemics in the corpus, followed by dysentery (e.g., *roode loop*) and cholera (e.g., *Aziatische ziekte*). After this, a large number of various epidemics were recorded, although it is not always clear what the exact disease was. These diseases were described, for example, as 'fever' [*koorts*] or 'great sickness' [*grote ziekte*]. Together with diseases such as smallpox and influenza they represent the remaining 38 per cent of the entries about epidemics. It is noteworthy to mention that 73 per cent of the epidemics concern humans, 25 per cent concern animals, and 2 per cent concern plants.

When we look at how these diseases were spread over the early modern period, a few things stand out (*Figure 14*). The plague, or pestilence, was a frequent occurrence between 1500 and 1700, and especially in the second half of the sixteenth century and in the 1660s.²⁰ This infectious disease spread across Europe for centuries and mutated around 1348 into its most deadly variant known as the 'Black Death'. After the number

Explaining Epidemics (Cambridge, 1992), 293–304; Lindemann, *Medicine and Society in Early Modern Europe*, 51.

18 The full corpus consists of 204 chronicles: 132 from the Northern and 72 from the Southern Netherlands. Therefore, I used respectively 88% and 69% of the full corpus for this Chapter.

19 This is respectively 61% and 82% for the Northern and Southern Netherlands.

20 L. Noordegraaf and Gerrit Valk, *De Gave Gods: De Pest in Holland Vanaf de Late Middeleeuwen* (Bergen, 1988), 43–47, 152.

of victims reached its peak in the fourteenth century, the disease became less deadly. Yet, it remained endemic in Europe until the last major plague outbreak in the 1720s.²¹

During the same period, a new epidemic, the cattle plague, swept across Southern and Central Europe starting in 1709. Presumably the transnational oxen trade between Denmark and Holland served as the conduit that brought the epidemic to the Low Countries, where it started spreading in 1713.²² The cattle plague mainly raged in the eighteenth century, with three 'waves' around 1713-21, 1744-55, and 1765-85.²³ The infection rates could reach as high as 100 per cent, and mortality ranged from 60 to 90 per cent. As a result, the Dutch Republic alone lost approximately 120,000 to 300,000 head of cattle during the first wave, which had major social and economic consequences.²⁴

21 For international literature on the pest, see: Paul Slack, *Plague: A Very Short Introduction*, 307 (New York, 2012); Cohn, *Epidemics*; Frank Martin Snowden, *Epidemics and Society: From the Black Death to the Present*, Open Yale Courses Series (New Haven, 2019); For literature on 'pest' in the Low Countries, see: Noordegraaf and Valk, *De Gave Gods*; A. H. M. Kerkhoff, *Per Imperatief Plakkaat: Overheid En Pestbestrijding in de Republiek Der Zeven Verenigde Nederlanden* (Hilversum, 2019).

22 Adam Sundberg, *Natural Disaster at the Closing of the Dutch Golden Age*, Studies in Environment and History (Cambridge, 2022), 55-56.

23 For the first and the second wave, see: Ibid., 51-88, 212-50; For the third wave, see: Filip van Roosbroeck, 'Experts, experimenten en veepestbestrijding in de Oostenrijkse Nederlanden, 1769-1785', *Tijdschrift voor Geschiedenis* 128, no. 1 (1 January 2015): 23-43; Filip Van Roosbroeck, 'Caring for Cows in a Time of Rinderpest: Non-Academic Veterinary Practitioners in the County of Flanders, 1769-1785', *Social History of Medicine* 32, no. 3 (1 August 2019): 502-22; Filip Van Roosbroeck and Adam Sundberg, 'Culling the Herds? Regional Divergences in Rinderpest Mortality in Flanders and South Holland, 1769-1785', *Tijdschrift Voor Sociale En Economische Geschiedenis/ The Low Countries Journal of Social and Economic History* 14, no. 3 (23 January 2018): 31.

24 Sundberg, *Natural Disaster at the Closing of the Dutch Golden Age*, 59.

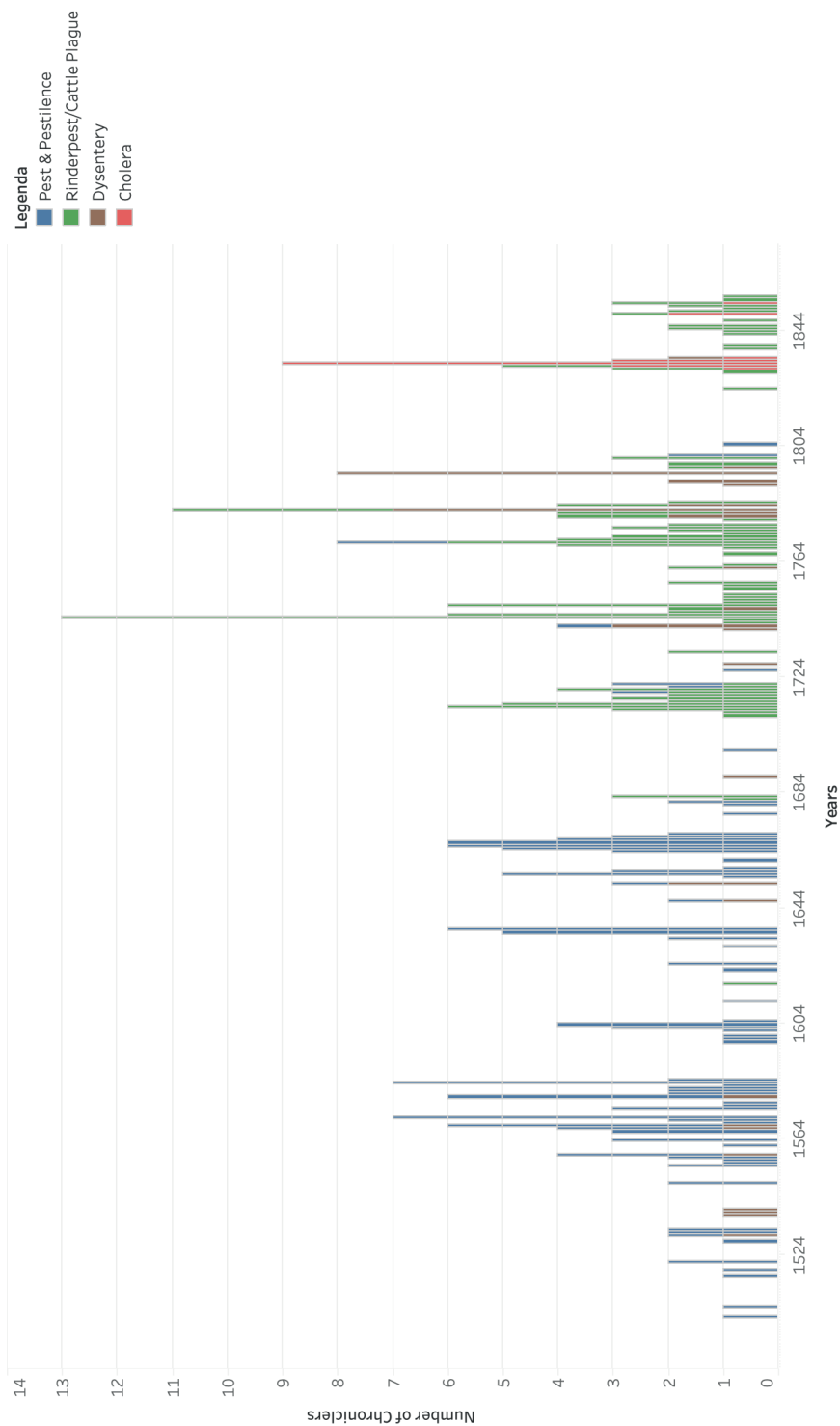


Figure 14. Number of chroniclers reporting on an epidemic per year.

Our period ends with the outbreak of cholera. Originating in Asia, this disease reached Europe around 1830 and the Netherlands in 1832. About half of those infected died from the disease, especially in the lower classes of society, leading to social tensions.²⁵ Initially, it was thought that the disease spread through the air, but in 1849, the English physician John Snow (1813-58) discovered that the disease also spread through contaminated drinking water. However, we will see that chroniclers had already been doubting traditional 'miasmatic' explanations for over a decade.

Plague, rinderpest, and cholera particularly left a great mark on the early modern period and in the lives of the chroniclers. They will therefore occupy a prominent place in this chapter, but other diseases will also be discussed, with the aim of investigating when and under what conditions new knowledge about epidemics was accepted and what consequences this had for existing knowledge. We will first discuss how chroniclers explained epidemics and where those explanations came from. Then, we will address the natural processes that, according to the chroniclers, influenced the emergence and spread of diseases in the sixteenth and seventeenth centuries. From the eighteenth century onwards, new explanations emerged, a greater role was attributed to environmental factors, and tension arose between medical theories and the observations of chroniclers. As a result, we will see how chroniclers solved these tensions and combined new medical insights with traditional theories.

Explaining Epidemics: Reasoning with Analogies

In the late summer of 1568, the Catholic lawyer and official in the Court of Flanders, Philip van Campene (c.1516-c.1567) found himself amidst an epidemic that had been spreading in the city of Ghent, one that would remain endemic for several more years. He meticulously chronicled the progression and the measures taken against the disease, beginning with an ordinance announced by the local authorities. Van Campene wrote:

On the sixth day [of September] with the sound of a trumpet, the aldermen of the law [*Kuere*] have proclaimed an ordinance concerning the plague, warning that in the houses, where the plague is, people should put their dogs and cats to death, and that people coming from foreign and suspected regions are not allowed to lodge or stay [in the city]. The disease has been in this city since mid-August and increased daily, especially at St. Peter's, in the Savaenstraete and other places, so that now two scourges of the Lord circulate in these Netherlands, namely: war and plague, to punish the community.²⁶

²⁵ Snowden, *Epidemics and Society*, 233–67.

²⁶ "Ten sesten hebben scepenen vander Kuere met gheluut van eenen trompette ghedaen publiceren een ordonnantie, touchierende de peste, vermanende dat de ghebueren vanden huusen, daer de peste es, zouden

The measures listed by Van Campene proved insufficient. Over the next three years he described how the plague ravaged the city. The authorities took measures to prevent its spread. In 1569, trade in (soft) fruits was banned, and from 1570 houses where the plague ruled were marked with a bundle of straw, to indicate that no one should go near them.²⁷ When household members died of plague, they were buried at night so as to reduce fear among society. In addition, members of the affected household had to walk with a four-foot white cane for fourteen days after the last person had died or when there were no more signs of illness. A year later, measures were further tightened, and people from infected houses were forbidden from conversing or venturing out on the streets during the day.²⁸

Van Campene's chronicle not only describes the measures taken by local authorities, but also incorporates his personal observations and beliefs. According to him, the pestilence was a divine punishment for the wars amongst Christians, particularly between Don Fernando Álvarez de Toledo, the third duke of Alba (1507-82), and William of Orange (1533-84).²⁹ During this period, the Netherlands were engulfed in a civil war, known as the Dutch Revolt. A year before the epidemic's outbreak, the Duke of Alba had marched into the Netherlands with an army of 10,000 soldiers to strike down the rebellious Calvinists and reaffirm the dominance of the Catholic faith. In 1568, the Prince of Orange undertook a failed expedition to 'liberate' the Netherlands, while '*geuzen*' attacked ships and coastal areas.³⁰ Like many contemporaries, Van Campene was afraid that the Netherlands would descend into a civil war such as was raging in France.³¹ Divine punishment extended beyond the battlefield to the whole community, which Van Campene also considered responsible for causing the epidemic. Van Campene referred to the *Book of Jeremiah* (14:12) when he wrote:

dootsmijten huerlieder honden ende catten, ende dat hem nyemandt vervoorderen en zoude te logieren ende herberghen de lieden, commende uut vremde ende ghesuspecteerde contreyen, want de voornomde siecte sichtent halfougst lestleden heeft binnen deser stede gheweest ende daghelics vermeerdert, sonderlinghe up sint Pieters, inde Savaenstraete ende andere plaetsen, zo dat nu twee gheeselen vanden Heere upgheheven zijn in dese Nederlanden ende , te wetene: oorloghe ende peste, omme tghemeente te punieren.' Van Campene and Van Campene, *Dagboek van Cornelis en Philip van Campene*, 175.

27 Van Campene and Van Campene, *Dagboek van Cornelis en Philip van Campene*; Similar measures are also seen a few years earlier in the chronicle of: Adelbertus Cuperinus, 'Die Chronicke van der vermaerder en de vromer stad van 's-Hertogenbosch etc', in *Verzameling van kronyken, charters en oorkonden betrekkelyk de stad en Meijerij van 's-Hertogenbosch*, ed. Cornelis Rudolphus Hermans, vol. 1, 5 vols ('s Hertogenbosch, 1847).

28 Van Campene and Van Campene, *Dagboek van Cornelis en Philip van Campene*, 272.

29 Ibid., 175; This was widely believed by Catholics at the time, see: Pollmann, *Catholic Identity and the Revolt of the Netherlands*, 57-59, 92, 153-58.

30 Israel, *The Dutch Republic*, 155-78.

31 For more information on chronicles used to study the reception of news during the civil wars in France and the Netherlands, see: Baars, *Rumours of Revolt*, 54-84.

The community is also afflicted by a period of dearth and pestilence, due to its sins and misdeeds, as we daily hear nothing but war, one Christian against the other. This was all foretold by the prophet Jeremiah. We, due to our evil deeds, estrange ourselves from God, both the priests and the common man.³²

Van Campene continued by listing a number of sins, especially of monks and priests, but the epidemic was first and foremost a collective punishment from God.³³

We see a similar conviction among Reformed chroniclers such as the farmer and mill master Claes Baerntsz. (1574-1651) from the small village of Hauwert in Holland. He wrote in 1636 that epidemics – unlike most other diseases – were a punishment for the collective sins of the community.

[The people] who did not die of pestilence but remained alive should not think that they are better than those who were taken away by death. Because, among those who died of the plague, there were many pious and God-fearing people. Yes, much more pious and God-fearing than many of those who did not die of plague.³⁴

This idea of epidemics as divine punishment was one widely shared among both Catholics and Reformed chroniclers. Chroniclers could find evidence for this while reading Scripture and other religious books, but more importantly from the sermons of pastors and preachers interpreting epidemics as a providential sign.³⁵

The belief that epidemics were a collective punishment from God goes back to the *Book of Genesis*, where Adam and Eve, initially immortal beings residing in the Garden of Eden, free of disease, suffering, and labour, lost all of this when they defied God's command by consuming the forbidden fruit from the Tree of Knowledge of Good and Evil. This disobedience symbolised humanity's fall from grace and innocence. God expelled

32 'tGhemeente wierdt oock gheplaeght met dieren tijdt ende peste, ende dit al naer tvoorsegghen vanden prophete Hieremias, omme huerlieder sonden ende mesdaeden, dwelck ooc wel dient in desen benauden tijdt gheconsidereert over al, want men daghelics anders nyet en hoort dan oorloghe, den eenen Christene jeghens den andere; wij, bij toedoen van quade werken, vervremden ons van God, zo wel de priesters als de ghemeene man.' Van Campene and Van Campene, *Dagboek van Cornelis en Philip van Campene*, 139.

33 Ibid.

34 '[...] Die [mensen die] niet gestorven en sijn aen de Pestelentie: maer int leven syn ghebleven dat sij beter syn, dan die gene die door den doot syn wech ghenomen. Want voorwaer daer sy onder die ghene die aen de Pest ghestorven syn, veel vrome ende Godt salijghe menschen gheweest. Ja veel vromer ende Godt salijger, als dien die niet aen den pest gestorven syn.' Claes Baerntsz, 'Kort verhaal der gedenckwaerdigste gheschiedenissen van Westvrieslant', Noord Hollands Archief, Haarlem, 176 Losse Aanwinsten (verkregen tot 1984) 1530, fol. 161 verso.

35 Walsham, *Providence in Early Modern England*; Parets and Amelang, *A Journal of the Plague Year*; Van Egeraat, "'Zoo Zij Ghesindt Waeren'"; Walsham, *The Reformation of the Landscape*; Chroniclers also copied sermons during epidemics showing this. See, for example: Van Campene and Van Campene, *Dagboek van Cornelis en Philip van Campene*, 201.

Adam and Eve from the Garden of Eden, decreeing that they should endure disease, labour, childbirth pains, and ultimately, death. Essentially, diseases embodied the 'wages of sin'.³⁶

In the Dutch context, scholars in the 1980s argued that religious explanations became more dominant in the seventeenth century as a result of the Reformation.³⁷ However, recent research on sixteenth-century chroniclers has demonstrated that there was no discontinuity between natural and divine explanations. These explanations continued to be used side by side, but in both centuries epidemics were in first instance interpreted as a punishment from God.³⁸

In the previous chapter we saw how chroniclers were searching for providential signs and how they made comparisons between similar occurrences. To a large extent, this also applied to epidemics. Unlike for many meteorological phenomena, there were biblical analogies for epidemics. Chroniclers often drew upon biblical passages to create parallels with their own time striving to make sense of their experiences. This type of 'analogical' or 'synchronic' way of thinking was widespread in early modern Europe and is characterised by an emphasis on similarities rather than the differences between past and present.³⁹ Historians have demonstrated that a continuum was assumed between events in Scripture and contemporaries' own time. The experiences and lessons from the past were directly applicable to the present. As a result, preachers continually presented biblical analogies during weekly sermons. These were given not as abstract examples but as an impending reality.⁴⁰

This way of thinking in analogies was not limited to an educated elite of scholars and clerics but was also prevalent among our chroniclers. One of the most frequent references was made to the *Book of Jeremiah*, which was also cited by Van Campene. The Catholic lawyer and brewer Willem Jansz. Verwer (c.1533-80) from Haarlem, however, paraphrased excerpts from *2 Samuel 24*:

We poor sinful people humbly beg you through your boundless mercy, that just as you have punished and afflicted the prophet David and his people with such a terrible pestilence for their sins that, as it is written, seventy thousand men died in three days and through his prayers and penitence the pestilence ceased, O merciful Father, we also now acknowledge that you send this pestilence and punishment upon us, because of our great sins.⁴¹

36 Snowden, *Epidemics and Society*, 10–11.

37 Noordegraaf and Valk, *De Gave Gods*, 129–30.

38 Van Egeraat, "Zoo Zij Ghesindt Waeren"; Dekker, 'Coping with Epidemics', 229–47.

39 Jorink, 'Tekenen van Gods gramschap', 184–85; Jorink, *Reading the Book of Nature*, 30; Pollmann, *Memory in Early Modern Europe, 1500-1800*, 48.

40 Jorink, 'Tekenen van Gods gramschap', 186; Pollmann, *Memory in Early Modern Europe*, 48.

41 '[...] wij arme sondighe menschen bidden u oetmoedelijc deur u grontlooze barmharticheijt, dat Ghij ons, soe David die prophet om zijnen sonden willen in zijn volc met een zoe grusamen pestelentie gestrafft ende

Verwer hoped that the epidemic would end if he and his fellow townspeople, just like David, repented their sins, so that God would lift the 'period of dearth, pestilence [...] and war.'⁴²

The combination of dearth, pestilence and war is a well-known premediated combination, often observed by chroniclers in especially the second half of the sixteenth century. Van Campene's fellow townsman, the Catholic Marcus van Vaernewijck (1518-69), a merchant and official from Ghent as well, noted in October 1566 that: 'Sieges of cities and war are sent by God, like pestilence and periods of dearth.'⁴³ He wrote this a month after the iconoclasm took place on 22 August. A period of dearth had preceded it from 1565 until the summer of 1566.⁴⁴ Like Van Campene he saw parallels between the events in his own time and those in the Old Testament where many of these disasters can be found in 'abundance', according to him.⁴⁵

In addition to the patterns that were constructed, it is also noteworthy which patterns were not observed by the chroniclers. When chroniclers wrote about the combination of war, dearth and pestilence, they did not refer to the *Book of Revelation* (6:1-8) in which these plagues are represented by the four horsemen of the apocalypse as harbingers of the Last Judgement. Andrew Cunningham and Ole Peter Grell noted in 2000 that especially in sixteenth- and early seventeenth-century Europe, apocalyptic expectations and eschatological speculations were prevalent.⁴⁶ In 2001, Huib Zegwaart asserted that with the exception of a few case studies, research on apocalyptic thought in the Low Countries is understudied.⁴⁷ Van Egeraat's recent research on sixteenth-century pamphlets, however, has shown that compared to Germany, there were hardly any references to the Last Day in the Netherlands, and even fewer in chronicles.⁴⁸ This result is confirmed by my investigation of our larger corpus of chronicles.

Apart from the scriptures, sixteenth- and seventeenth-century chroniclers also employed secular historical examples to interpret epidemics. According to Van Vaernewijck, punishments from God were not only documented in the 'Old Testament

gheplacht hebt, dat na men leest in drie daghen seventich duijsent man gestorven zijn ende doer zijn bidden ende penitentie die pestilentie opgehouden is, O barmhartighe Vader, nu bekennen wij oeck, dat Ghij dese pestelentie ende straff over ons sendt, omme onse groote sonden.' Verwer, *Memoriaelbouck*, 159.

42 '[...] duere tijt, pestilentie ende van [...] oorlog.' Ibid.

43 '[...] belegghen van steden ofte oorloghen, die Godt zent, als pesten ende diere tijden.' Van Vaernewijck, *Van die beroerlicke*, 297.

44 Van Dixhoorn, 'The Grain Issue of 1565-1566', 171-204.

45 Van Vaernewijck, *Van die beroerlicke tijden*, 103.

46 Andrew Cunningham and Ole Peter Grell, *The Four Horsemen of the Apocalypse: Religion, War, Famine, and Death in Reformation Europe* (Cambridge, 2000), 1.

47 Huib Zegwaart, 'Apocalyptiek: overzicht van een verwaarloosd gebied in het Nederlandse bijbelonderzoek', in *oden, christenen en hun Schrift. Een bundel opstellen aangeboden bij het afscheid van C.J. den Heyer*, ed. C. Houtman and L.J. Lietaert Peerbolte (Baarn, 2001), 130-46.

48 Van Egeraat, "Zoo Zij Ghesindt Waeren", chap. 4.

[...] but could also be read and experienced in abundance in historical writings.⁴⁹ Some chroniclers therefore included lists of miracles and preternatural events in their chronicles, usually commencing with the birth of Christ and then progressing into their own time. One of these chroniclers was the Catholic official and *politiemeester* Justus Billet (1593-1682) from Ghent. Drawing on historical examples, he observed a direct causal relationship between the epidemic and its causes, demonstrating a combination of analogical and providential reasoning. When people lived in sin, God intervened, and when they repented, God halted the plague. For instance, Emperor Hadrian (76-138) died from a mysterious illness, 'by the punishment from God, because he persecuted Christians.'⁵⁰ In the year 1057, a plague beset the city of Ghent, but after the inhabitants expressed remorse and prayed to God, Mary, and Ghent's patron saint Macharius (?-1012), the plague ceased.⁵¹

These historical examples, often used in sermons to interpret and explain epidemics, also reveal how patterns derived from Scripture were used to make connections between events in the past. In the sections of the chronicle that discussed events before the time of the author, we often see a close relationship between epidemics, dearth and war, with particularly the first two phenomena often linked together. Billet noted in 890 that for example: 'a large and terrifying pestilence emerged after a period of dearth'⁵² and in 1157 'a long period of dearth was followed by a terrifying and vehement pestilence.'⁵³ Billet observed numerous other patterns such as pestilence and periods of dearth. What struck him and other chroniclers about these and similar observations was that these 'punishments' did not occur without a warning. Preceding the period of dearth and famine in 890, Billet recorded various prodigies:

49 '[...] int aude testament ghevanghen [...] dwelc men ooc bij veel hijstoriën overvloedelic lesen ende ondervindenmach.' Van Vaernewyck, *Van die beroerlicke tijden*, 103.

50 '[...] door een straffe Godts, om dat hij de Christenen soo vervolcht hadden.' Justus Billet, 'De cleene ofte corte chronycke van Dhr. Justo Billet, begrypende in forme van eenen register ... van saecken principalick gheschiet binnen de Stadt van Ghendt, midtgaders van eenighe steden van Vlaendren, van Duytslandt ... tot den jaere 1564. In twee volumen, waer naer noch dry andere sullen volgen, eyndende met de jaere 1666, deel 1', Stadsarchief Gent, Bibliotheek 1LF2 and GSA1, fol. 10 verso.

51 'Soo was tot Ghendt een dusdanighe groote peste dat sij daeghlicx wech sleipte 5 ofte 600 zielen, maer door de vierighe ghebeden tot Godt, ende door de intercessie van Maria, ende den H. Macharius, soo cesseerde de selve.' Ibid., fol. 49 recto.

52 '[...] ende uijt desen dieren tijt sproter een soo groote, ende afgrijselicke peste.' Billet, 'Den polytye boeck [...] deel 7', fol. 76 recto.

53 '[...] wiert tot Milaenen, [...] twee sonnen, ende eenighe daeghen daernaer twee maenen, als voorboden van groote straffen die soudien volgen, [...] eenen grooten dieren tijt, die ghevolcht wiert van een schrickelicke, fenijnighe peste.' Justus Billet, 'Den polytye boeck [...] deel 8', fol. 59 recto.

In the year 890, there were many signs seen in the heavens, and on earth, that could not be interpreted as anything but presages of God's wrath [...] For example, there was an earthquake in Rome that caused much ruin, and 2 monsters were born, one child had three heads, and a foal with three feet. In Puglia, a fountain changed its water into blood.⁵⁴

In the previous chapter we discussed that signs in the sky, such as comets, could be a warning for future disasters, but were difficult to interpret when they occurred. Escaping the punishment of God was hardly, if at all, possible. Contemporaries accepted the idea that not only the sinful but also the innocents were punished by an epidemic. According to Van Vaernewijck, 'in a communal plague, the good must suffer with the bad, and often the good and innocent suffer the most.'⁵⁵ Nevertheless, the 'innocents' could, to some degree, prepare themselves for God's wrath by heeding His signals. Van Vaernewijck stated that contemporaries shared the belief that 'if a change is imminent or if a plague is coming, God will announce it with signs in heaven, or on earth.'⁵⁶

Providential signs on earth were for example the birth of 'monsters' or events that could be interpreted in an analogical way.⁵⁷ Van Vaernewijck for example wrote in a paragraph on 'how the children in Ghent *prefigured* the coming time'⁵⁸ [my italics] that:

Sometimes with innocent creatures, such as among the children, as when plague is imminent, the children hold customary processions beforehand and go singing through the streets, such as when corpses are carried to the grave; when there is to be a war, they tend to imitate battles and fights among themselves, and so forth.⁵⁹

54 'Inden Jaere 890, waerender veel teekenken aen den hemel, ende op der aerden gesien, niet connende bedieden, als presagien van de gramschap Godts, [...] soo wasser binnen Roome een eertbevinghe die veel Ruinen causeerde, ende 2 Monsters gheboren, ende gheworpen, het eene kint hadde drij hoofden, ende een veulen met drij voeten. In Puglia veranderde een fonteijnen haer water in bloedt.' Billet, 'Den polytye boeck, ... beginnende den 22sten augusto in tjaer ons heeren 1658 deel 7', fol. 76 recto.

55 '[...] in een ghemeen quale van een ghemeente de ghoeide met de quade te lijden moeten hebben, ende dicwils de ghoeide ende onschuldighe aldermeest.' Van Vaernewyck, *Van die beroerlicke tijden*, 297.

56 'Men zecht ghemeenlic, alsser eenighe veranderinghe van tijde zal gheschien ofte eenighe plaghen regneren, dat Godt dat pleecht met zeker teekenken in den hemel of in der eerden te vertooghen.' Ibid., 256.

57 Alan W. H. Bates, 'Monstrous Exegesis: Opening Up Double Monsters in Early Modern Europe', in *The Body of Evidence: Corpses and Proofs in Early Modern European Medicine*, ed. Francesco Paolo de Ceglia (Leiden, 2020), 119–48.

58 'Hoe die kinderen te Ghendt prefigureerden den toecommenden tijt.' Van Vaernewyck, *Van die beroerlicke tijden*, 256.

59 '[...] somtijts met onnoosel creatueren als onder die kinderen, ghelijckerwijs alst peste wesen zal, zoo pleghen die kinderen daer te voren costumelic processien te maken ende ghaen al zijnghende achter straten, alzo men ten lijcken ten grave waert draecht; alst oorloghe zal zijn, zoo pleghen zij onderlinghe bataillen ende strijden te conterfeeten, ende alzo voort.' Ibid.

Here, Van Vaernewijck made an explicit analogy between a prodigy and the plague that awaited the community. This in combination with the other examples shows that contemporaries used both examples from the past and prodigies in the present to uncover the meaning of extraordinary phenomena by analogy.

This way of providential reasoning with preternatural events and analogies was shared by both Catholic and Reformed chroniclers until the seventeenth century. The Reformed teacher Pieter van Godewijck (1593-1669) from Dordrecht wrote about plague epidemics in his city in the years 1636-37 and 1657. With a reference to *Jeremiah* 17:27, he believed that 'the Almighty God has a thousand methods and rods with which to chastise humanity, all creatures stand ready at His service.'⁶⁰ This note explains why he recorded preternatural events such as the birth of a 'monster' in his hometown between the two epidemic waves in 1641, with the remark: 'what the significance of this is, or will be, is known only to the Almighty God.'⁶¹

Based on the examples discussed above, it is clear that chroniclers interpreted epidemics as a manifestation of divine providence, which was frequently preceded by a preternatural sign or prodigy. They derived this understanding from biblical and secular historical examples that they used to interpret and explain epidemics, often through analogies. For most people, the knowledge and skill to make such connections probably came from sermons. It is known that preachers tried to interpret disasters during their services, yet chroniclers also make such connections themselves.⁶²

Natural Processes: The Emergence and Spread of Epidemics

While chroniclers interpreted epidemics as a punishment from God, they also acknowledged that diseases occurred through natural processes. We have already seen that chroniclers recorded measures such as culling (stray) dogs and cats, and restricting travellers from staying overnight, which were believed to inhibit the progression of the plague. Historians have shown that, on the one hand, contemporaries believed that diseases were transmitted directly or indirectly between individuals, and, on the other hand, that diseases originated and spread through elements such as (corrupted) water and air, with certain places fostering specific illnesses. These explanations are often

60 'Den Almachtigen God heeft duysent middelen & roeden, daer de Menschen mede kunnen gestraft werden, alle Creatuyren staen tot synen dienst gereet.' Van Godewijck and Van der Schouw, *Dese heerlicke stadt*, fol. 78 recto.

61 '[...] wat voor beduydingh dat dit is, of wesen sal, dat is de Almachtige God bekent.' Ibid., fol. 58 recto; Bates, 'Monstrous Exegesis', 119-48.

62 Jorink, 'Teken en van Gods gramschap', 186.

categorised as contagionist and anti-contagionist (or miasmatic), respectively.⁶³ In 1992, Rosenberg suggested that during most epidemics 'both styles of explanation were employed in combination with one element or another featuring more prominently.'⁶⁴

Research has shown that medical experts favoured miasma-based explanations, but it is less clear what the beliefs of non-experts were when faced with such horrifying biological events.⁶⁵ Did they heed the advice and knowledge of medical experts, or did they have alternative explanations? If so, what influenced these beliefs? Charting the patterns constructed by chroniclers can provide insight into the natural processes they associated with epidemics. While examining the entries on epidemics in the chronicles, I have created three categories that chroniclers used to describe the natural processes: miasmas, contagion, and the influence of weather. Depending on the type of epidemic, a chronicler could use a combination of one or more of these categories to describe the natural processes.

Corruption and Miasmas

We have seen that chroniclers observed correlations and patterns between periods of dearth and the emergence of an epidemic by drawing on their contemporary experiences as well as biblical and historical events. Yet, these biblical and historical examples provided little insight into the natural mechanisms that caused and spread epidemics. When chroniclers themselves experienced epidemics, they speculated on what influence the various events had on each other.

The Catholic corn inspector from Ypres, Augustyn van Hernighem (c.1540-c.1617) for example, observed several times in the 1580s that pestilence and dearth occurred simultaneously. Moreover, he wrote that malnutrition predominantly affected poor individuals, but that the subsequent disease was contagious to the entire population.⁶⁶ This is mirrored in the chronicle of the Brussels merchant and local officer Jan de Pottre (1525–1601). On 4 December 1590, he recorded that 'many individuals fell ill due to extreme poverty, and also because they had consumed a large number of cranberries.'⁶⁷

These sixteenth-century chroniclers perceived a direct correlation between the lack of food and the emergence of an epidemic and could articulate the processes by which this transpired. The issue was not so much a lack of edible food, but rather that altered

63 For more information on the debate and the methodological problems with regard to contagion and miasma see: John Henderson, 'Historians and Plagues in Pre-Industrial Italy over the "Longue Durée"', *History and Philosophy of the Life Sciences* 25, no. 4 (2003): 481–99.

64 Rosenberg, 'Explaining Epidemics and Other Studies in the History of Medicine', 295.

65 Lindemann, *Medicine and Society in Early Modern Europe*, 52–53.

66 Van Hernighem, 'Beschrijving der stad Yper, deel 2', 248, 284, 320, 325, 333; See also: Luyten, *Kronijk uit het klooster*, 147; Van Haecht, *De kroniek van Godevaert van Haecht*, 13; De Pottre, *Dagboek van Jan de Pottre*, 186; Billet, 'De cleene ofte corte chronycke [...] deel 1', fol. 140 recto.

67 '[...] soe sijnder zeer veel sieken mede af ghecoemen van groote armoede, ende dat sy oock veel vinbesyen hadden gheeten.' Pottre, *Dagboek van Jan de Pottre*, 186.

dietary patterns precipitated by dearth caused contemporaries to fall ill, as exemplified by the excessive consumption of cranberries. The outcome was a contagious disease that could also infect other people. What chronicles may have meant by 'contagious' disease may be gauged from a comparable account in the chronicle of the priest Wouter Jacobsz. (c. 1521–95) from Amsterdam. He recorded that in June 1572, twenty-five individuals in the Convent of the Poor Clares fell ill due to poverty and famine, inflicted by the Calvinists – *Geuzen* who rebelled against the regime of the Duke of Alba – inducing 'severe unhealthiness within their bodies'.⁶⁸ As a result, 'they all carried a miasma that was unbearable. To dispel the stench and purify the air, several tar and pitch drums were lit within the convent'.⁶⁹

What these excerpts show is that inadequate, or altered, nutrition was believed to catalyse the onset of an epidemic. Examining the patterns that chroniclers constructed to describe the emergence and progression of epidemics in greater detail allows us to gain insight into their medical knowledge. As one might expect, they were familiar with Hippocratic and Galenic medicine, which for more than two millennia was the predominant – though not exclusive – medical paradigm in the West, and to a certain extent, the Arabic world.⁷⁰ Its origins go back to Hippocrates (c.460 to c.377 BCE), whose collection of approximately sixty works, known as the Hippocratic corpus and written by multiple authors, introduced a radically new conception of medicine: Disease is a purely natural event that can be explained only by secular causes and that can be treated only by rational means.⁷¹

Hippocrates's philosophy of medicine was further developed by Galen of Pergamum (CE 129–c.210 CE), who codified his theory into the canonical four humours: blood, phlegm, yellow bile and black bile.⁷² Each humour (in Greek: *khumos*), meaning 'juice' or 'flavour', in the body was needed to maintain a balanced equilibrium (*eucrasia*) with

68 'Die suspitie waerom dese cranckte onder dese aldus rees was die armoede ende benautheyt, welck in dit convent geledenwerden doer desen swaere benaude tijt ende toe // coemst van soeveel verjaechde clarissen als wuyt verscheyde plaetsen bij haer quaemen, die veelal doer lange hartseer, welck haer gestadelick gedaen was van den ongeschickte tyrannie der verkeerder guesen, groete ongesontheit in haer lichaemen vercregen hadden.' Wouter Jacobsz, *Dagboek van broeder Wouter Jacobsz (Gualtherus Jacobi Masius) prior van Stein: Amsterdam 1572-1578 en Montfoort 1578-1579. Deel 1*, ed. Isabelle Henriette van Eeghen, vol. 1 (Groningen, 1959), 336–37.

69 '[...] die alle sulcke lucht over haer hadden, dat dieselfde niet te verdraegen was, sulx dat om den stanck daer te verdriuen ende die lucht te suyveren int selfde convent veel teer ende pecktonnen gebrant werden.' *Ibid.*, 1:336.

70 R.J. Hankinson, 'Humours and Humoral Theory', in *The Routledge History of Disease*, ed. Mark Jackson, The Routledge Histories (London, 2017), 34; Vivian Nutton, 'The Fortunes of Galen', in *The Cambridge Companion to Galen* (Cambridge, 2008), 255; Snowden, *Epidemics and Society*, 19.

71 Snowden, *Epidemics and Society*, 9; Lindemann, *Medicine and Society in Early Modern Europe*, 13 Of these works, some are especially well-known, such as the "Hippocratic Oath"; On the Sacred Disease; On Human Nature; Epidemics; and Airs, Waters, Places.

72 Each humour (microcosmos) corresponds with the four elements (macrocosmos). Blood - air; yellow bile - fire; black bile - earth; phlegm - water.

the other humours to promote health. Illness resulted from disturbances, imbalances, or corruptions of these humours, caused by 'non-naturals'.⁷³ Most chroniclers were familiar with elements from the theory of 'non-naturals', as they entail a healthy and moderate life.⁷⁴ The definition and description of the non-naturals were first used by Galen in his commentary on the Hippocratic writings on epidemics, where he referred to them as 'categories of health'.⁷⁵ The six non-naturals were behavioural and environmental factors, including: air, water and climate; food and drink; exercise and rest; sleep and wakefulness; excretion and retention; and passions and emotions. In particular, the first one, miasmas or corrupted air, was deemed one of the most significant causes of epidemics, according to Galen.⁷⁶

From the examples above, it becomes clear that for chroniclers a distortion of the non-natural 'food and drink' could lead to an imbalance of the humours, creating miasmas such as described by Wouter Jacobsz.⁷⁷ The chroniclers' reflections on epidemics often refer to contemporary attempts to inhibit the spread of an epidemic by controlling the air. Wouter Jacobsz. wrote that people tried to purify the 'bad' air by igniting barrels of pitch, and in Billet's chronicle we read how Ghent's city council proactively implemented measures to prevent the emergence of miasmas. The new school for the poor [*armenschool*] was transformed into a spacious and clean building by the river Scheldt with extra-wide bedrooms for the children to ward off all kinds of diseases.⁷⁸

In addition to poor nutrition, chroniclers described how organic materials could also directly contaminate the air. Here, they pointed to the non-natural of 'corrupted air' as a significant cause of epidemics. For instance, in April 1571, Godevaert van Haecht (1546-99), the Lutheran painter from Antwerp, was critical of the local authorities for causing an epidemic. He wrote that the citizens of Antwerp believed that 'the pestilence spread from a malodorous corpse hanging in the wind [i.e., at the gallows] that had succumbed to the plague'.⁷⁹

A similar observation was documented by local official, Zegerus ter Stege (1535-?) from Steenwijk (Overijssel), who wrote that it was not just one infected body, but several casualties left on the fields following the Siege of Steenwijk (18 October 1580 – 23 February 1581) that triggered an epidemic. Due to the inability to swiftly bury the

73 Hankinson, 'Humours and Humoral Theory', 21–35.

74 See also: Paul van Dijk, *Volksgeneeskunst in Nederland en Vlaanderen* (Deventer, 1982).

75 James Kennaway and Rina Knoeff, *Lifestyle and Medicine in the Enlightenment: The Six Non-Naturals in the Long Eighteenth Century*, Routledge Studies in the History of Science, Technology and Medicine (Milton, 2020), 6.

76 Lori Jones, 'The Diseased Landscape: Medieval and Early Modern Plaguescapes', *Landscapes* 17, no. 2 (2 July 2016): 110.

77 '[...] groete ongesontheit in haer lichaemen.' Jacobsz., *Dagboek van broeder Wouter Jacobsz.*, 337.

78 Billet, 'Den polytye boeck [...] deel 2', fol. 46 recto.

79 '[...] dat de peste voorts waeyde van dat stinckende lichaem dat daer onder wint hinck en van der pesten gestorven.' Van Haecht, *De kroniek van Godevaert van Haecht*, 150–51.

deceased, he wrote, 'the air in Steenwijk has become utterly inflamed and contaminated. Initially with a pestilential disease, and subsequently with a severe plague.'⁸⁰ Ter Stege substantiated his account with figures: 'Initially it began with 6, 8, 10 deaths per day, peaking at mid-summer with one hundred and twenty victims daily, and in the autumn, 25, 30, 35 daily casualties.'⁸¹

The idea that the air could become infected was supported by empirical observations such as the one of Lambrecht van den Hoevel (?-1636). This secretary of Oisterwijk described how 'the birds, flying over the countryside, caught the pestilence and fell to the ground', at a time when his city was in the grip of an epidemic caused by corrupted air.⁸² To escape the miasmas Van den Heuvel remarked that wealthier citizens, including 'councillors and some of the elite [*gequalifiseerden*],' fled for twenty-two weeks, leaving ordinary citizens behind.⁸³

The fact that corrupted organic material often has a 'bad smell' makes it evident that people from all walks of life associated it with danger. Therefore, during epidemics, chroniclers frequently recorded that livestock was moved outside the walls of the city, streets were cleaned, restrictions were imposed on butchers, and bans were placed on perishable organic material such as fruit. These records show that an epidemic could originate locally due to poor nutrition, stench, or the rotting of matter. Yet, its spread occurred through people, animals, or goods, which could be 'contagious' [*besmettelijk*]. How did chroniclers think 'contagion' worked, and did their views change depending on the circumstances?

80 '[...] is de lugt tot Steenwijk geheel ontsteeken en geïnfecteert, eerst met een pestelentiale krankheijt, daerna met een heftige pest.' Zeyger ter Stege, *Aanteekeningen van Mr. Z. ter Stege, vermeerderd met nalezing en bijvoegsels* (Meppel, 1859), unpaginated.

81 'Daer aen met ten eersten alle dagen 6, 8, a 10 menschen sijn gestorven, en voorst in 't midden van de Somer des daags hondertht twintig menschen. Ende op den herfst dagelijks 25, 30, 35 menschen.' Ibid.

82 '[...] voogelen over de vreijsheijt vliegende het vier ontfangen en ter aarden vielen.' Lambrecht Van den Hoevel, 'Plaatsbeschrijving van Oisterwijk met kroniek van de jaren 1566-1609', ed. M. Pinkhof, *Bijdragen en Mededelingen van het Historisch Genootschap* 40 (1919): 158; See also: Jan Vivere and Anonymous, *Chronijcke van Ghendt: handschrift deelmakende van het archief van Burchtgraaf Vilain XIII te Bazel in 't licht gegev. door Frans de Potter*, ed. Frans De Potter (Ghent, 1885), 327.

83 Van den Hoevel, 'Plaatsbeschrijving van Oisterwijk', 158–59.

A Contagion or the Contagion?

In 1563, the nun Maria Luyten (c.1540-70) from Weert (Limburg) recorded how an epidemic ravaged the entire city:

This pestilence started in the Beekstraat at the tavern of *Billeken van Horne*. The daughter of the inn keeper became infected after she swept up the vomit of a man. Because of this, she passed away, but nowhere more people died than in the Langstraat. Both inside and outside the gate. In some houses nine or ten people died, or as many as there were present in that house.⁸⁴

Five years later, in March 1568, Luyten wrote that a new pestilence was again sweeping through the town. This time, it started in a tavern at the Hoogstraat – an extension of the Beekstraat. The disease, according to Luyten, spared no one. Between twenty and fifty people died daily, the old and the young, the rich and the poor alike. In June, Luyten observed that the disease had reached its peak, but unfortunately in September, it reached her convent. She detailed how a servant of the convent had attended the annual fair, returned home ill, and was subsequently cared for in a separate room. The servant eventually died three days later, on 29 September. The three people who had cared for him also succumbed within two weeks, after which the disease stopped spreading within the convent.⁸⁵

Between the two epidemics, separated by five years, we observe a recurring pattern and a notable difference in the spread of the epidemics. In both cases, the disease was believed to have originated in a tavern and thus perhaps introduced by a foreigner. The import and export of people, animals, and goods were strictly controlled during an epidemic. Yet, when analysing these fragments in more detail, it appears that contemporaries believed that diseases were 'transmissible' in more than one way.

In 1563, Luyten attributed the spread to the spit of a sick man, and in 1568, it was their own servant who had come into contact with contagious individuals at the fair. The convent remained unaffected between March and September, apparently due to minimal contact with people from the city. In the first case 'the contagion' was a substance, transmitted by contact through a chemical or vital poison which, in this instance, was the vomit of the man. In 1568, the people themselves were 'contagious'. Michael Worboys (2016) highlighted this subtle difference in the use of the word 'contagion', which is mirrored in the chronicles.⁸⁶

84 'Deese pest quam eerst in de beeckstraat bij Billeken van Horne, met eenen man die daer in de herbergh was, daer het die dochter van cregh als sy opgeveght hadde daer hij gespouwt hadde, daer sij oock van storf; maer nergens storf het soo seer als in de langhstraet binnen en buijten de poort; want in sommige huijsen storfender wel 9 oft thien of soo veel als er in een huijs was.' Luyten, *Kronijk uit het klooster*, 159.

85 Ibid., 200–201.

86 Michael Worboys, 'Contagion', in *The Routledge History of Disease*, ed. Mark Jackson (London, 2017), 71.

The notion of 'the contagion' as an infected substance that caused disease was applied to both humans and animals. In the chronicle of the mill master and Reformed elder Claes Barentsz. (1574-1651) from Hauwert, a detailed description is present of how a 'lung disease' amongst cows was transmitted from one animal to another between 1638 and 1639. According to Claes Barentsz, the disease was highly contagious:

This disease is of such a condition that when it appeared among cows in a certain home or land it rarely does not spread to other animals. It infects the other cows as well with their saliva or breath (so it appears) when another animal stands or goes next to an [infected] animal.⁸⁷

Although Barentsz. could not confirm by direct observation that the disease spread in this way, it was a plausible hypothesis. When a human or animal was sick, this also meant that the bodily fluids were disturbed and infected. This idea of 'the contagion' did not explain how the spread of diseases through people and goods worked at times when no 'contagious' substance like saliva was involved. But the chroniclers also provided an answer to this mode of transmission, which Worboys termed 'a contagion'.⁸⁸

Billet provided a detailed account of how 'a contagious' disease spread from March to November 1666. His account includes a list of twenty-three 'infected' areas from where the epidemic began to spread. In some cases, Billet could also determine where the disease started to emerge. The infection could be traced to a cobbler through whom the disease had been brought from Antwerp.⁸⁹ Another source of infection also came from outside – from an area 'not far from the gate of Bruges. These five houses were infected with commodities bought and brought from London in England to this city [of Ghent].'⁹⁰

To understand how Billet compiled this list, we need to examine two volumes he wrote in the previous year. From an earlier volume of Billet's chronicle, it is evident that he was monitoring the progression of the 'contagious disease' in London, which had claimed approximately 8,000 lives in September 1665.⁹¹ Therefore, it is not surprising that Billet drew a connection between the epidemics in London and Ghent. Seven months later, he wrote:

87 'Dese sieckte is so danige sieckte van Conditie, daer die Comt, onder die koe beesten in eenich Huijs ofte lant, daer verscheijden beesten sijn, daer sal het seer selden bij een blijven: maer besmet die andere Beesten oock met haer seever ofte Adem (alsoo het schijnt) Als eenen Beesten die daer bij staen ofte bij gaen.' Baerntsz, 'Kort verhael der gedenckwaerdijgste gheschiedenissen van Westvrieslant', fol. 229 verso.

88 Worboys, 'Contagion'.

89 Billet, 'Den polytye boeck [...] deel 11', fol. 17 recto.

90 '[...] Ende een ander niet verre vande Brughsche Poorte. Dese Vijf huijsen sijn gheinfecteert gheweest, door goederen ghecocht ende ghebrocht van Londen in Inghelant binnen deser voorseejde Stede.' Ibid.

91 Justus Billet, 'Den polytye boeck, ... beginnende den 22sten augusto in tjaer ons heeren 1658 (1658-1668) deel 9', Stadsarchief Gent, Bibliotheek 1LF2 en IGD1, 529 (C. Handschriften), fol. 27 recto.

Schautheet, a free captain from this city (living between the Predickheeren ende Recollecten Brugghe) returned with his ship from London in England from where he brought some commodities that he bought. Suddenly he died, as did the person who had confined him and who had fallen ill in the process.⁹²

According to witnesses, it was pestilence. The aldermen promptly isolated the captain's house, and those potentially infected were transferred to the plague house.⁹³

The idea that epidemics mostly came from 'abroad' was widely shared among chroniclers. Yet this fragment also demonstrated that chroniclers believed that houses could be infected and that humans, animals, and goods could be carriers of disease. The latter applied especially when these could hold 'air'. For example, in an anonymous chronicle from Kortrijk it is described how in October 1667 an epidemic started at the home of Pieter Kesteloot, where wool was being spun from Tourcoing, France. The wool was contaminated with pestilence, resulting in the death of the entire family of ten children, including the servants who came into contact with the wool. The disease then spread throughout the city, causing many more deaths.⁹⁴

The idea that wool, in particular, was a carrier of disease is a recurring theme in sixteenth- and seventeenth-century chronicles.⁹⁵ Contemporaries believed that due to the insulating and open structure of wool, it was a potential carrier of (bad) air. This idea is associated with the concept that miasmas caused diseases, as discussed in the previous section. The combination of miasmas and 'contagious substances' is most often cited by chroniclers to describe the origin and spread of epidemics.

The Influence of the Weather

Returning to the chronicle of Van Campene we see a surprising additional cause for the emergence of diseases. He wrote in July 1568 that the 'extraordinary heat [...] induced pestilence in certain locations.'⁹⁶ Van Hernighem wrote something along similar lines: 'around this time, the 12th of February, pestilence started to ignite within the city

92 'Schautheet Vrij schipper deser stede (woonende tusschen de Predickheeren ende Recollecten Brugghe) ghekeert met sijn schip van Londen in Inghelandt, vanwaer hij mede ghebrocht hadde eenighe particuliere goederen, voor sijne rekenijnghe, soo is hij subijtelick commen te sterfven ghelijck oock heeft ghedaen den persoon die hem hadde ghekist ende daer bij sieck gheworden.' Justus Billet, 'Den polytye boeck, ... beginnende den 22sten augusto in tjaer ons heeren 1658 (1658-1668) deel 10', Stadsarchief Gent, Bibliotheek 1LF2 en 1GDL, 529 (C. Handschriften), fol. 33 verso.

93 Ibid.

94 Anonymous and Philippus Van de Maele, 'Chronycke van Corttryck', Rijksarchief Kortrijk, Fonds Goethals-Vercruysse, ms. 215, 60.

95 For a seventeenth-century example from the Dutch Republic, see: Anonymous and Jan Gerritsz Waerschut, 'Kroniek van Rotterdam', Stadsarchief Rotterdam, 33.01 Handschriftenverzameling inv.no. 1552.

96 '[...] de uutmeneende hitte [...] ende waer uute in sommige plaetsen es een pestilentialie siecte gheresen.' Van Campene and Van Campene, *Dagboek van Cornelis en Philip van Campene*, 157; See also: Luyten, *Kronijk uit het klooster*, 178.

of Ypres, due to the mild weather which has never been seen before by anyone alive. The weather did not change, and it appeared to be summer instead of winter.⁹⁷

As discussed in the previous chapter, anomalous seasons were often interpreted as the result of divine intervention, but, according to some chroniclers, these anomalies also disrupted the balance between the humours and as a result caused illness. Yet, this pattern between the weather and the emergence of diseases was not common knowledge. Only those who had above-average knowledge of the theory of Hippocrates and Galen to a larger extent could know about the idea that there was a relationship between the seasons and the humours. A disturbance in the seasons could upset the balance of the humours, although other factors such as age and climate also played a role.

According to Galenic medicine, summers were supposed to be hot and dry and winters cold and wet. It is no wonder that deviations and their consequences were closely followed by some chroniclers. Billet offers one of the most illustrative passages that demonstrates how and which factors influenced the way in which contemporaries thought about epidemics. On 9 October 1666, he wrote that:

The weather was very good, sweet, warm, and quiet, as if it were May, because instead of frost there was dew in the morning. As if it were summer, herbs, flowers and trees appeared young and green, similar to the summer season. Also, the sown grains, which were many, are already grown a half of a *vierendeel* high. Whether this is a good or bad sign is only known by God. What is certain, is that this warm weather may spread the contagious disease.⁹⁸

In other words, Billet observes several deviations from the annual pattern. It was not only the presence of dew instead of frost that caught his attention, but also the state of the vegetation. Due to the sunny and warm weather the grain was already a '*vierendeel*' high, which was taller than normal around this time of year. How this deviation in the season was to be interpreted 'only God knew', but some patterns were evident. Warm weather during late autumn, and particularly in winter, was conducive to the proliferation of diseases. Therefore, it was vital for him to keep an eye on the weather.

97 '[...] ontrent desen tyt van den 12 van sporkele beghonste de peste zeer te onstekene binnen ypere want het en was noyt ghezien by mans leven datte zulck zoocht weder was alzoot bleef continueren want het scheen bet somere te synne van wynter.' Van Hernighem, 'Beschrijving der stad Yper, deel 2', 192.

98 'In desen tijdt. Soo was het een weder, soo goet, soet, waerme ende stille, alof het inden Meij hadde gheweest, want het daude des smorghens, in plaetse van Rijm, alof het inden Somer gheweest hadde gheweest, staende de Cruijen, de Blommen, ende de Boomen, soo Jeughdich ende soo groen, ghelijck men die siet in het Somer Saijsoen. Oock Soo staen der ghesaijde graenen, heel veijl, wel een half vierendeel hooghe, ofte beth ghegroijt; Of dit nu goeden ofte quaede Teekenen sijn, dat is Godt alleene bekendt; Dan het is seecker, dat dit waerem weder, niet goet en is voor de contagieuse Zieckte.' Billet, 'Den polytye boeck [...] deel 11', fol. 5 verso.

Two months later, little had changed, which heightened Billet's awareness about the consequences. He wrote:

Wednesday, December 22 [1666]. Here in Ghent, and other places in Flanders, warm, pleasant, and damp weather, combined with clear sunshine and southern winds made it feel like summer, however, Christmas is upon us. Consequently, there was a common fear that a great disease would result in mortalities among people. In addition, people were afraid of a poor harvest due to cold nights, because the grains were too high, as they still grew lustily in the fields.⁹⁹

Not only Billet, but others around him noticed a deviation from the natural pattern that allowed diseases to emerge and the grain to grow too early, making it especially vulnerable to cold weather.

Four days later, the danger had passed, and the weather became 'normal' again. The community was left with mixed feelings, showing that the emergence and spread of diseases was experienced differently among the population.

Sunday, December 26, the day after Christmas day. The sweet weather started to change. A fierce and biting cold with frost and ice caused great joy among most people, both for the sake of their health and that of the fertility of the grains in the fields. However, poor people, who had a hard time keeping themselves warm, expressed their concern and sadness, because they knew that they would suffer tremendously until Easter was upon them.¹⁰⁰

These excerpts highlight how different societal groups responded to unusual weather patterns and their correlation to diseases. As emphasised by Abraham Maslow (1908-70) and other psychologists since the 1940s, this did not depend just on cultural factors, but also on the socio-economic status of the authors.¹⁰¹ People who lack basic

99 'Woonsdach den 22en dito. Soo was het hier tot Ghendt, ende apparent in alle andere Plaetsen van Vlaendren, een soo schoon, soet ende Vochtich weder, ghemeinghelt met schoon Sonneschijn, ende Zuijdelicken winden ghelijk of het somer hadde gheweest daer wij nochtans bij de kersdaeghen waeren; oversulcx wasser een ghemeene Vreese, datter eenighe groote Zieckten, ende sterften onder de Menschen soude commen, alsmede een slecht ghewas vande Graenen, alsoo die te hooghe, ende te gulsich stonden en groijden op het Velt, faucte van Rijmeghe, ofte Vorstighe nachten.' Ibid., fol. 31 recto-verso.

100 'Sondach den 26en xbre 1666 sijnde den 2en kersdach, soo begost het goet ende soet weder te veranderen, in een straffe ende bijtende caude, met Rheijm ende Vorst, daer over veel Menschen seer verblijdt waeren, soo om de ghesontheit vande Menschen, als om de Vruchtbaerheijt vande Graenen op het Velt, doch de Aerme Lieden, die niet wel gheduffelt en waeren, bethoonden daerover druck en droefheijt, want sij wisten wel, dat sij veel souden lijden eer het Paesschen was.' Ibid., fol. 31 verso.

101 A. H. Maslow, 'A Theory of Human Motivation', *Psychological Review* 50, no. 4 (1943): 370-96; Abraham H. Maslow, *Motivation and Personality* (New York, 1954); Louis Tay and Ed Diener, 'Needs and Subjective Well-Being Around the World', *Journal of Personality and Social Psychology* 101, no. 2 (2011): 354-

needs such as shelter, warmth and security were primarily focussed on their struggle for survival, whereas more affluent individuals could literally afford to worry about more complex cultural phenomena and therefore constructed different patterns. However, this does not mean that the poor in this example could not have knowledge of the relationship between weather and disease. For them, a cold winter just posed a greater threat than catching a potential disease.

Although a higher level of education, and therefore more knowledge of humoral theory, is a plausible explanation for the different patterns that chroniclers constructed, the influence of contemporaries' socio-economic background should not be underestimated. While the size of this corpus enabled me to observe long-term developments, it was too small to link these developments to social profiles. Nevertheless, the following examples provide a basis for further research.

Although some chroniclers like Van Hernighem and Billet interpreted anomalous weather as both a possible punishment from God and a danger to the health of humans and animals, other chroniclers interpreted it as a blessing. The sixteenth-century Verwer wrote on 27 December 1575: 'This year it was a sweet and soft winter until Christmas, little ice and snow [...] This year, the summer was also dry and a beneficial harvest. Praise God.'¹⁰² In contrast to the previous examples, Verwer linked drought and mild temperatures to beneficial harvests, especially that of barley when we take other years into account as well. Knowing that barley is one of the raw materials for beer, and given Verwer's profession as a brewer, it is not surprising that he thought in different patterns than, for example, Billet.

A similar observation can be found in the seventeenth-century chronicle of the farmer and aldermen Pieter Florisz. Gertses (c.1630-c.1716) from the small village of Jisp (Holland). Gertses recorded the dates on which his cows and calves were brought into the stables at the year's end. On 14 December 1652, he wrote: 'it was not without God [...] that we put our cows in the stable with beautiful and dry weather', indicating that the weather had been favourable enough for the cattle to remain in the fields throughout autumn.¹⁰³ Consequently, the farmer did not need to purchase hay, implying significant cost savings. In other words, and although the two are not mutually exclusive, a relatively warm winter was a blessing for a substantial part of society, while others feared potential disaster.

65; Uriel Abulof, 'Introduction: Why We Need Maslow in the Twenty-First Century', *Society* 54, no. 6 (1 December 2017): 508–9.

102 'Dit jaer tot Kersmis toe een soete sachte winter, nauwelix ijs of sneu [...] Dit jaer ist oock een droghe somer ghewest ende een schoone oost. Lof Godt.' Verwer, *Memoriaelbouck*, 171.

103 'Niet sonder godt [...] haelde wij onse koeije op het stal met moij weer droech weer.' Anonymous, 'Aantekenboek betreffende Jisp, met beschrijving, 1647-1716', Waterlands Archief, Purmerend, 0954 Collectie persoonlijke documenten en handschriften, 1518-1968, inv.no. 1, unpaginated.

Conditions for the Acceptance of New Knowledge

Although it is difficult to determine whether Verwer and Gertses were aware of the influence of weather on the humours, their profession would undoubtedly have played an important, if not dominant, role in the way they thought about the relationship between weather and diseases. In the eighteenth century, we see the relationship between the influence of weather and the spread of diseases increasing among chroniclers. Moreover, alternative explanations for the origin and spread of epidemics also reached non-experts. New observations challenged existing explanations, leading to discussions between chroniclers and contemporaries. It is these reflections of the chroniclers that can provide us with insight into the conditions for the acceptance of new knowledge and how traditional and new explanations related to each other in the minds of early modern people.

A Corpuscular Explanation of Epidemics in the Eighteenth Century

In the small Dutch village of Huizen in 1713, Lambert Rijckxz. Lustigh (1656–1727), a farmer and alderman, sought to understand the rinderpest (cattle plague) outbreak that had spread across the Low Countries from 1713 until 1720.¹⁰⁴ To do so, he maintained a chronicle in which he documented all information that might help halt the epidemic. He was well-read and conducted his own research by making observations and engaging with ministers, officials, and other farmers, but did not receive any formal medical training at a university. However, he gave an exceptionally detailed description of the origin and spread of rinderpest. According to Lustigh, it was not only the 'corrosive' and 'poisonous' air that made people and cattle sick but also the 'fiery sparks' (*vierige vonckxkens/voncken*) within them.¹⁰⁵

In spring 1713, Lustigh postulated that the plague was caused by the 'element air' that was shaped by God in a specific way and subject to change under the influence of meteorological phenomena.¹⁰⁶ Consequently, he believed that one location could be more infectious than another, depending on specific atmospheric conditions. During sunrise, sunset, and in the absence of clouds, the air was especially pestilential.¹⁰⁷ Clear skies

104 Sundberg, *Natural Disaster at the Closing of the Dutch Golden Age*, chap. 2.

105 Lambert Rijckxz. Lustigh, 'Kroniek van Lambert Rijckxz. Lustigh Te Huizen Voornamelijk Betreffende Gooiland, 1654-1727', Noord Hollands Archief, Haarlem, 176, Losse aanwinsten (verkregen tot 1984) van het Noord-Hollands Archief te Haarlem, inv.no. 1572, 15–17. For more information on Lustigh, see also: A. Nonymus, *Lambert Rijckszoon Lustigh, schepen van Huizen* (Huizen, 1973); J.G. Koeman, 'Lambert Rijcksz. Lustigh', *Tussen Vecht En Eem. Centrale Organisatie van Vrienden van de Historie van Het Gooi En Omstreken*, May 1974.

106 Lustigh, 'Kroniek van Lambert Rijckxz. Lustigh', 2.

107 Ibid., 3.

and a strong sun intensified the power and contagion of the infected air, often resulting in a suffocating stench.¹⁰⁸

Although the influence of the weather was described in more detail, Lustigh's description is similar to that of chroniclers of the sixteenth and seventeenth centuries. Moreover, he also drew analogies between his own time and events in the Old Testament. Referring to *Exodus* 1:7-9 and 12:37, Lustigh deduced that there were fewer than 600,000 Egyptians when they were punished by God for refusing to free Moses and the other Israelites. Comparing this to the number of cows that perished, he concluded: 'This fiery destructive plague of pestilence rages and prevails much greater and heavier here in our land than it ever did in the time of the stubborn Pharaoh in the land of Egypt.'¹⁰⁹

With hindsight, Lustigh also realised that God had given some signs of impending punishments in advance, though at the time he did not understand their meaning.¹¹⁰ In 1713, he reflected on an incident in 1707, when several villagers reported hearing moaning and crying in a field. Lustigh initially thought that his children had suffered a severe mishap, but they were merely playing. A search was launched to find the source of the sounds, but after locating the area, no one was found. Lustigh wrote that:

At that time, I had noted this in a small notebook, but about two years ago I tore this notebook into shreds and discarded it and even though I read this omen then, and thought that it would never be fulfilled, I threw it away torn up along with some other papers. But unfortunately we now see this true sign in all its circumstances, both in the sickness, death, and burial of the animals as well as in the moaning, weeping, and lamenting of the humans to whom this has happened.¹¹¹

What was most striking about this fulfilment was that on the same day, an ordinance was published regarding the rinderpest and a cattle farmer by the name of Gerrit Lambertsz. was burying five cows at exactly the same location as where the weeping was heard a few years earlier.¹¹²

¹⁰⁸ Ibid.

¹⁰⁹ '[...] dese vierige verderffelijke plage van pestilentie alhier te lande veel grooter en swaarder woet en grasseert als deselve oijt ten tijde van den verstockten pharao in Egiptenlant gedaan heeft.' Ibid., 66.

¹¹⁰ Ibid., 31-34.

¹¹¹ '[...] Ik doen ter tijt op een kleijn klatboeckje hadde aengetekent maar ontrent twee Jaar geleden doen hebbe Ik dit klatboeckje aen stucken gescheurt en wegh gedaan en alhoewel Ick dit voorteken doen noch las, en dagt dat het selve noijt vervullen soude, soo wirp Ik het gescheurt met eenige andere papieren wegh Maar Ach, maar Ach, soo siet men, dit waragtigh voorteken Jegenwoordigh in alle sijne omstandighheden Zoo in 't sieck worden sterven en begraven der beesten als oock in 't kermen weenen en stenen der menschen vervevallende.' Ibid., 32.

¹¹² Ibid., 33.

At first glance, Lustigh's chronicle seems to ascribe the emergence of epidemics to providential and to 'corrupted air', as did some of the previously discussed chronicles. Yet there is also a notable difference. The corrupted air, often carried by dew, contained 'fiery sparks' which could cause a corrosive and burning sensation when they came into contact with a person's eyes.¹¹³ These 'fiery sparks', inducing disease were borne not just by the air, but were also dropped on the earth by God. Subsequently, these particles would 'adhere' (*aenkleven*) to water and grass, rendering them contagious (*besmettelijck*). Consequently, not only the cows were vulnerable as they breathed in the air and consumed the contaminated water and grass, but also the individuals who tended to and milked them when they were venturing outdoors and whose 'bare legs [...] were contaminated with great fervour and pain.'¹¹⁴ Lustigh explained that this process was similar to what happened to the eyes. The pestilential air induced reactions in the tissue it touched and could even penetrate the skin.¹¹⁵

As I have argued elsewhere, the ideas in Lustigh's chronicle derived from Greek atomists, especially Lucretius (c. BCE 94–c. BCE 50).¹¹⁶ Lucretius's ideas had been transformed into a consistent theory by the Italian physician Girolamo Fracastoro (c.1476–1553) and had been incorporated into the work of the renowned Dutch physician Johan van Beverwijck (1594–1647). Although Lustigh does not mention these medical experts by name, his account of how an epidemic spread was written along very similar lines, so we can assume that he was familiar with their work.¹¹⁷

As we have seen, chroniclers explained the spread of epidemics through miasmatic vapours and contagious substances which could be transferred by direct contact (e.g., saliva), at a distance (miasmas), and through fomites, that is by substances or objects that spread the disease such as (woollen) clothing.¹¹⁸ Fracastoro, and thus Van Beverwijck and Lustigh, agreed that miasmatic vapours could cause pathological changes. However, they maintained that these vapours did not initiate contagions. Instead, this was caused by the 'seeds' carried through the air.

In other words, Fracastoro added a layer of complexity, in which these 'seeds' travelled in corrupted air, that could be absorbed by an individual either through inhalation or through the skin. These invisible particles or *semina*, as described by Fracastoro, could be produced in the sky when atmospheric conditions were conducive

113 Ibid., 3, 15–17.

114 '[...] hare bloote benen [...] met groote vierigheijt en serigheijt besmet wierden.' Ibid., 3.

115 Ibid., 3, 14.

116 Theo Dekker, 'God's Invisible Particles as an Explanation for the Rinderpest Outbreak (1713–1714): The Reception of Medical Knowledge in the Dutch Republic', *European Journal for the History of Medicine and Health* 79, no. 1 (3 May 2022): 152–68.

117 Ibid., 162.

118 Francesca Maria Crasta, 'Fracastoro, Girolamo', in *Encyclopedia of Renaissance Philosophy*, ed. Marco Sgarbi (Cham, 2018), 6.

to their propagation. Once they had penetrated their host, these corrupted particles could multiply, leading to the putrefaction of humours. The resulting imbalance led to an excess of bodily fluids and, therefore, sickness. Fracastoro's concept of *semina* (seeds of disease) led to a new ontological theory of disease, marking a significant contribution to the discourse on the transmission and causes of disease among medical practitioners in the sixteenth and early seventeenth centuries.¹¹⁹

This theory found its way into Lustigh's chronicle through the medical works of Van Beverwijck. He was one of the most renowned Dutch physicians of the seventeenth century, who wrote in the vernacular and collaborated with Jacob Cats (1577-1660), the 'Dutch Homer' to popularise his *Schat der gesontheyt* (1636), *Schat der ongesontheyt* (1642), and *Heel-konste* (1645).¹²⁰

The belief that 'contagious' particles could 'adhere' to the environment, people, and animals was thus endorsed by Lustigh, but not by others in his vicinity, as evidenced by their actions. On the last day of October, several farmers in the villages of Naarden and Hilversum declared they would bring their cattle in from the fields early, hoping to avoid infection. Lustigh observed that these farmers refused to believe that their cattle could have already been contaminated by these particles in the fields. His attempts to persuade them were met with derision. Once the cattle moved from the crisp autumn air into the warmth of the stables, huddled closely together, Lustigh described how the pestilential 'force' in the air became active and made its presence known.¹²¹

To convince these farmers, he used an analogy to which they could relate. Lustigh explained that when people spent a long time in a cold and damp environment, they often became unwell and fuzzy upon entering a warm house with a lit stove.¹²² In the process, the cold infected vapours people carried with them became active, causing illness. The same thing happened to the cows that were moved to the barn from the cold pasture. In other words, it was not the warm air that caused illness in people or animals, but the disease-inducing particles activated in the air.¹²³

Drawing on his thorough and meticulous investigation, Lustigh composed three sections of 'advice and remedies' aiming to assist his fellow citizens.¹²⁴ He listed practical measures alongside religious ones, sharing what he had learnt about the most effective methods to stop the rinderpest outbreak. But although Lustigh's advice might have been

119 Dekker, 'God's Invisible Particles', 157–59.

120 Ibid., 164.

121 Lustigh, 'Kroniek van Lambert Rijckxz. Lustigh', 23.

122 '[...] want dat is, gelijk een mensche die een Lange tijd in een dampige koude Lugt geweest is, en de koemende in warme Huijsen en voornaam daar een warme kaghel gestooct wert, ende soo hij dan in de koude Lugt eenige onreijne en ongesonde dampen ontfangen heeft, ende soo in warme Huijsen ofte bij warme gestoochte kaghels koemende, het breekt uijt, ten minsten met flauw worden of met bedraijinge.' Ibid., 23.

123 Ibid., 23.

124 Ibid., 53–55.

lifesaving, 'most [farmers] despised my words and counsel,' he wrote, recounting how some even threatened him with violence to silence him.¹²⁵

We can read in his chronicle that Lustigh was deeply disheartened by his contemporaries' refusal to acknowledge the importance of his findings. He saw them as 'unwise and unwilling to learn', yet he was unable to persuade them, in spite of the various examples he presented.¹²⁶ This might be explained by Lustigh's confrontations with the church council. In 1700, he was reprimanded by the church council for facilitating 'esoteric' gatherings. After several meetings, the minister and the *schout* put an end to this, but this did not prevent Lustigh from straying from the ecclesiastical path again during the epidemic in 1714.¹²⁷ In that year, he is said to have baptised a deceased Catholic. Initially Lustigh was denied communion, but after expressing regret, he was readmitted. Although Lustigh was respected as *schepen* of Huizen, these conflicts may thus have caused villagers to see Lustigh as a troublemaker, according to J.G. Koeman.¹²⁸ Yet, this does not fully explain why farmers in the surrounding area also did not accept his advice and better explanation for the epidemic, knowing that it could save their livestock.

To explain this, we must also look at this case in an anthropological way. Although Lustigh and his contemporaries largely interpreted epidemics through the lens of Galenic medicine, he introduced a more abstract and complex explanation that could not be empirically tested or verified. Despite his theory of particles being plausible based on his observations, the more precise and intricate theories employed by medical experts, such as Fracastoro and Van Beverwijck were not widely embraced by non-experts, even though they were available in popular print media.

As we saw with the lightning rod in the previous chapter, it was important that contemporaries understood a new explanation and that they could empirically verify it. The latter was difficult because the corpuscular 'particles' could not be directly observed. Again, this illustrates that *content* bias played an important role in the acceptance of new knowledge.¹²⁹

Another important factor that may have contributed to the non-acceptance of Lustigh's advice is the extent to which the explanation differed from traditional explanations. Vivian Nutton, who in 1990 studied the dissemination of the corpuscular theory of disease among medical practitioners, argued that it was 'not perceived as radically different but was easily incorporated into the Galenist system of interpretation.'¹³⁰ The added value of the theory was therefore limited for many contemporaries which,

125 '[...] maar sij veragten voor het merendeel mijne woorden en raatgevinge.' Ibid., 57.

126 'onverstandigen en niet leren willende.' Ibid., 29.

127 Koeman, 'Lambert Rijksz. Lustigh', 28–29.

128 Ibid., 28–29; Nonymus, *Lambert Rijkszoon Lustigh*.

129 Richerson and Boyd, *Not by Genes Alone*, 205.

130 Vivian Nutton, 'The Reception of Fracastoro's Theory of Contagion: The Seed That Fell among Thorns?', *Osiris (Bruges)* 6 (1990): 234.

according to Nutton, limited its popularity to the late sixteenth and early seventeenth centuries.¹³¹ This makes it remarkable that a century later Fracastoro's ideas reappeared in Lustigh's work, but at the same time this demonstrates that for most non-experts, a new explanation must be distinctive and verifiable before it is accepted.

The corpuscular theory of diseases could not be proven with direct observation and was not distinctive enough for most contemporaries. Nevertheless, from the eighteenth century onwards, we see that chroniclers increasingly made notes about cases where existing theorisation did not correspond with their own observations. Initially, this did not lead to rejecting these explanations and their medical theory, but it did create space for alternative explanations that became visible from the nineteenth century onwards.

The Relationship Between Traditional and New Knowledge

Falsifying Traditional Explanations with New Information

Jan Kluit (1722-1811), a tax collector and official, wrote in 1748 about a 'mysterious' disease afflicting a regiment of the Scots Brigade stationed in Brielle during the War of the Austrian Succession (1740-48). The high mortality rates among the Scottish soldiers, according to him, warranted an explanation. Some referred to the work of the sixteenth-century chronicler François le Petit (1546-?), who worked from 1595 to 1598 as a notary in Middelburg seventy kilometres south of Brielle.¹³² He argued that the air in the South Holland town of Brielle was miasmatic due to its location close to the sea.¹³³ Others suggested that it was not so much the air itself, but the drastic change in environmental conditions between Scotland and the Low Countries, which caused illness among the Highlanders.¹³⁴

Both explanations demonstrate the importance that contemporaries ascribed to the influence of the environment in explaining diseases in the eighteenth century. On the one hand, the sea was viewed as a source of the emergence of miasmas; on the other, it was argued that a changing environment and climate could disrupt humours. The cause of the disease was mainly debated on a theoretical level within the framework of Galenic medicine. However, according to Kluit, there could also be alternative explanations. There were instances of other diseases attributed to sea air, which were also encountered inland. Furthermore, Petit had probably never visited Brielle, so he had assumed

¹³¹ Ibid.

¹³² Jean François Le Petit, *Nederlantsche Republycke, Bestaande Inde Staten so Generale, Als Particuliere*. (Arnhem, 1615), 136.

¹³³ Kluit, 'Historische Jaerboeken der stad Briel, deel 1, 1e stuk, 1747-1751', 36, 501.

¹³⁴ Ibid., 441.

something detrimental about the city that he could not substantiate.¹³⁵ Kluit found this unacceptable, as he wrote:

For they reason in this way, that when one asks for their rationale, they reply that they have heard it from their parents, and thus they pass on these stories to their children and descendants, without having uncovered the naked truth of it all.¹³⁶

Kluit asserted that not medical theory, but empirical observations, led to the 'truth'. He demonstrated this by using an example. It was widely believed that the air in Maassluis was healthy, despite the town's proximity to Brielle. Yet, Kluit, who confessed he was no expert in 'geometry', found it implausible that the air could change going from healthy to unhealthy over such a short distance.¹³⁷ Kluit followed this line of reasoning to explain the 'mysterious' disease affecting the Scots. He noted that a common belief was that the cities of Breda and Gorinchem had the purest air in the Republic. However, Kluit discovered that even more soldiers died in these cities. This seemed to rule out that 'miasmatic' air caused the deaths.¹³⁸

The news reached Kluit that in Gorinchem there had already been a ban on potatoes and cabbage among the Scots because they caused diarrhoea. Combined with the knowledge on the number of deaths in various cities, Kluit started 'to investigate the true and essential cause of the disease and mortality of the Scots.'¹³⁹ He observed and analysed the Highlanders' diet in Brielle, since every Monday after they received payment, the Scots consumed large quantities of fruit and vegetables, which were particularly cheap that year at the vegetable market. After some observations, Kluit concluded that the disease was likely due to the quantity and preparation of their food. After sharing his findings, petty officers surveyed the vegetable market and advised the Highlanders to cook their meals and eat in a more 'civilised' manner. Kluit observed that these measures proved effective, and that the Scots grew as healthy as their Dutch counterparts. His conclusion, based on these observations, was that it was not the air that made the Highlanders sick, but their lifestyle – specifically, their food consumption.¹⁴⁰

¹³⁵ Ibid., 36–38.

¹³⁶ 'Want zij redeneeren op dese trant, dat als men hun na reden vraagt zij antwoorden dat zij het wel van hunne ouders gehoord hebben, en dese verhalen het dus weder aan hunne kinderen en nakomelingen, sonder van dit alles de naakte waarheit ontdekt hebben.' Ibid., 40.

¹³⁷ Ibid., 41–42.

¹³⁸ Ibid., 440–43.

¹³⁹ '[...] om de waarachtige en wesentlijke oorszaak van de siekte en sterfte der Schotten te onderzoeken.' Ibid., 443.

¹⁴⁰ Ibid., 439–57.

As had Lustigh and Kluit, from the eighteenth century onwards, other chroniclers began to compare their own observations, along with the information they heard and read, with contemporary explanations and medical theory. As we will see in the next chapter, the new availability of demographic figures enabled chroniclers to discover new patterns, and the newspaper also allowed for the tracking of the spread of epidemics both domestically and abroad. For example, the Catholic Edouard Callion from Ghent chronicled how cholera spread across Russia and Europe, and finally reached Belgium in 1832. A committee was established, hospitals were set up, the city was cleaned, and information was distributed so that people could protect themselves from the disease. This included an emphasis on clean air, hygiene, emotional restraint, and dietary restrictions, all in line with Galen's non-naturals.¹⁴¹ In addition, several masses and processions were performed in honour of Saint Nicholas (270-343), Anthony of Padua (1195-1231) and Ghent's patron saint Macharius to seek support and to pray to stop the epidemic.¹⁴²

Callion closely followed who died where in the city and concluded in May 1832 that the disease was limited to certain neighbourhoods and that 'almost all the individuals affected by cholera belong to the lower class.'¹⁴³ Moreover, age also played a role as it was particularly the elderly people and children up to two years of age who died.¹⁴⁴ Apart from concluding that the disease originated abroad, and was confined to certain areas and age groups, Callion also focussed on determining how the disease spread. On 4 June, a child died 'whose body emitted a very contagious stench.'¹⁴⁵ It was widely believed that the disease spread through the air, a belief seemingly validated by the 'highly infectious stench' emanating from the victims. For this reason 'tar barrels [which] were burnt [...] to purify the air from the harmful vapours.'¹⁴⁶ Yet, according to Callion, poor nutrition and miasma were not the only causes of cholera.

In one of the halls of the former Bijloke Abbey, which at the time served as a hospital and home for elderly men (*oudemannenhuis*), a renovation had been carried out adhering to the highest contemporary standards, ensuring ample space and high ceilings. Despite this, cholera also broke out in this hall, reinforcing Callion's assertion that 'uncleanliness or unhealthy air do not necessarily cause cholera. The disease could also be triggered by other factors which are not yet known to us.'¹⁴⁷ This meant that, on

141 Edouard Callion, 'Gentsche kronijke: 1525-1835', vol. 6., Universiteitsbibliotheek Gent, Boekentoren, BIB.G.014248, 477-80.

142 Ibid., 482-85; See also: Jo Claes, *Geneesheiligen in de Lage Landen* (Leuven, 2005).

143 'Byna alle de personen, die door den cholera zijn aengetast, behooren tot de geringe klas.' Callion, 'Gentsche kronijke: 1525-1835', Vol. 6., 492.

144 Ibid., 577.

145 'Een kind was ontrent den avond overleden, wiens lyk eenen zeer besmettelijken stank uytwassemde.' Ibid., 494.

146 '[...] er pektenonnen gebrand [...] om de lucht te zuiveren van de kwaede dampen.' Ibid.

147 '[Men heeft aldaer iets zeldzaam opgemerkt, het welk bewyst dat het] niet altyd onreynigheyd of ongezonde lucht is die den Cholera veroorzaekt; maer dat de ziekte aen oorzaken moet toegeschreven worden, die tot hier toe onbekend zyn.' Ibid., 499.

the basis of various observations, it could be ruled out that miasmas, whether caused by poor nutrition or not, were the exclusive source of cholera. Although it took another two decades before the physician John Snow (1813-58) proved, and subsequently published, that cholera was spread primarily by water rather than air, alternative explanations were already being diligently sought in the city of Ghent in 1832.¹⁴⁸

With the availability of new information such as mortality rates, and observations made by chroniclers and others, medical theories could be increasingly tested and therefore falsified. In other words, knowledge became increasingly 'tight'. Not only 'cultural entrepreneurs', but also chroniclers such as Kluit argued that knowledge passed down from generation to generation did not necessarily lead to the 'naked truth'. Empirical research and comparisons with other sources were necessary to arrive at an explanation.¹⁴⁹

Combining Old and New Ideas

However, empirical research did not (directly) undermine traditional explanations. New observations were often incorporated into existing theories. As a result, elements from germ theory of disease, Galenic medicine, and the purifying effect of lightning as a result of divine intervention were combined in early modern chronicles. This can best be demonstrated using the nineteenth-century chronicle of the Mennonite farmer from the small Frisian village of Poppenhuizen: Lieuwe Jans de Jong (1798-1855).

Like Callion, De Jong wrote extensively about the cholera epidemic. However, for the purpose of this paragraph, we will focus on his observations about what his contemporaries labelled the 'lung plague' (*contagious bovine pleuropneumonia*), a cattle disease that pervaded the Low Countries. After approximately 40,000 head of cattle had already succumbed in the province of Holland, the disease infiltrated two small villages in Friesland in February 1842.¹⁵⁰ De Jong meticulously recorded the disease's proliferation until his death in 1855.

In the initial year of the epidemic, De Jong neither reflected upon nor investigated the disease's transmission, but merely asserted that disasters were an indication of divine providence.¹⁵¹ This changed in subsequent years. He began to note that the lung plague first appeared in the two small villages of Nijega and Doniawerstal. A committee of veterinarians promptly initiated an examination, concurring with the governor that the animals needed to be culled 'to stop the evil at the beginning'.¹⁵² Unfortunately, this approach seemed to have little impact. By November of the same year, the disease

148 Snow, *On the Mode of Communication of Cholera*, 1849; For the famous map with the location of the water pumps and the infected areas, see the second edition: Snow, *On the Mode of Communication of Cholera*, 1855.

149 Kluit, 'Historische Jaerboeken der stad Briel, deel 1, 1e stuk, 1747-1751', 40.

150 De Jong, *De dagboeken (1825-1855) van Lieuwe Jans de Jong*, 153.

151 *Ibid.*, 106.

152 '[...] het kwaad in den begin te stuiten.' *Ibid.*, 153.

had also spread across the province of Drenthe and continued to be endemic in South Holland. Without access to a cure, infected animals were slaughtered across various provinces to curb the disease's spread, according to De Jong.¹⁵³

In April of the following year, De Jong started pondering, 'what caused the mortality of so many calves?'¹⁵⁴ He began enumerating factors related to the previous summer's weather and diet, such as the ingestion of inferior-quality grass and even poorer drinking water due to periods of drought. As we have witnessed in chronicles from the sixteenth century onwards, contemporaries directly associated poor nutrition, weather, and the onset of disease. To counteract the drought and rejuvenate their pastures, some farmers proposed inundating their lands. During the same time, a mouse plague also occurred and, by flooding their land, farmers hoped to solve two problems at once.¹⁵⁵

According to De Jong, this approach was ill-advised. He contended that storks do not consume dead mice, implying that leaving them to decompose in the fields would be detrimental. The fumes from the decaying mice, coupled with the dry warm air, resulted in miasmas harmful to the health of the livestock. Unlike other chroniclers, De Jong emphasised that these miasmas were not just 'contagious' but also 'salty', comprising saltpetre and phosphorus substances derived from the dry soil and dead mice.¹⁵⁶ When combined with water, this would – according to Lustigh – generate a 'contagious substance' (*smetstof*), harmful not only to livestock but possibly to humans as well, according to De Jong.¹⁵⁷ This was in addition to the fact that the unseasonably hot weather already impacted the quality of dairy products. Due to its inferiority, many individuals, including his own son Uiltje, suffered from fever, diarrhoea, and various lower abdominal diseases.¹⁵⁸

Beyond the common explanations attributing epidemics to a contagious substance, abnormal weather conditions, and miasmas, De Jong also proposed more complex explanations, especially for the spread of the disease. For example, he contemplated, 'is it possible that the mother could have become infected [...] and passed it on to her calves [through breastfeeding]?'¹⁵⁹ He tried to recall if his cows had exhibited any symptoms of sore teats toward the year's end, suggesting the infection could also inhabit the udder.¹⁶⁰ After all, many of the cows were not producing much milk, though De Jong hoped this would improve once they were allowed back out to pasture.

153 Ibid., 164–65.

154 'Van waar de sterfte onder veel kalveren?' Ibid., 169.

155 Ibid., 235–39.

156 'Salty' refers to 'salt', a chemical compound composed of positively, and negatively charged ions. A well-known example is table salt composed of sodium chloride (Na^+Cl^-), or Salpeter (K^+NO_3^-).

157 De Jong, *De dagboeken (1825-1855) van Lieuwe Jans de Jong*, 239.

158 Ibid.

159 'Is het ook mogelijk, dat de moeder een ongesteldheid of ongemak heeft gekregen [...] zich aan de vrucht overdroeg?' Ibid., 169.

160 Ibid., 169.

Throughout the course of the epidemic, De Jong sought to gather as much information as possible about the disease, taking into account observations from farmers, butchers, and veterinarians. He recorded in March 1851, 'The examples of infectiousness are incomprehensible; the stories about it are many and miraculous.'¹⁶¹ What is striking is that De Jong frequently discussed observations made during the dissection of diseased cows. He wondered for instance, that 'the pulmonary ailment in many, if not all [cows], resulted in a significant accumulation of fluid in their chests. Is this blood turned into water? There is also little blood present during their slaughter.'¹⁶² De Jong characterised the fluid as being yellowish, and hence potent and choleric. He pondered whether it could damage the delicate and tender tissue of the lungs, and whether bloodletting could prove beneficial, thus thereby reducing the transformation of blood into this harmful fluid, known today as pulmonary oedema.¹⁶³

While De Jong interpreted his observations through the lens of Galenic medicine, he did not perceive an imbalance of the humours as the primary cause of the disease. For example, there were instances where cows birthed calves that were 'dead and corrupted'. Despite this, the cows appeared healthy and produced ample milk. This led De Jong to speculate about the potential for 'disease transference from mother to offspring'.¹⁶⁴ To account for this, De Jong advanced a theory informed by his understanding of smallpox and its corresponding vaccination.

De Jong was a proponent of vaccination and consequently had his children immunised against smallpox several times. This spurred him to consider the following:

Might cattle also possess a contagious substance [*smetstof*] for lung disease, just as it is argued that all humans possess a smallpox matter [*pokstof*], which, through the transmission of this illness, develops and expands this matter, leading to sickness and death, depending on the greater or lesser amount of matter present in the body or lungs? Are there also those who do not possess the contagious matter of lung disease, or in whom it does not develop during the illness of others, and subsequently becomes active again?¹⁶⁵

161 'De voorbeelden van besmettelijkheid zijn onbegrijpelijk, de verhalen desaangaande veel en wonderlijk.' Ibid., 279.

162 'De longziekte bij velen, zoo niet allen, veel water in de borst. Is dit in water veranderd bloed? Weinig bloed bij dooding.' Ibid., 284.

163 Ibid., 341.

164 'Was dit een ziekteverplaatsing van de moeder op de vrucht?' Ibid., 341.

165 'Zoude het vee ook een smetstof tot longziekte bezitten, even als men redeneert, dat alle menschen een pokstof bezitten, die door mededeling van deze ziekte, deze stof als ontwikkelt en uitbreidt en tot ziekte en dood brengt, al naar de meerder of mindere stof in het ligchaam of longen aanwezig? Zijn er ook, die geen smetstof der longziekte bezitten, of bij ziekte der overigen nog niet tot ontwikkeling komt, en naderhand nog weder tot werking komt?' Ibid., 285.

Despite the fact that lung disease, unlike smallpox, is caused by a bacterium rather than a virus, De Jong's analysis is strikingly accurate. It illustrates that the medical knowledge De Jong obtained from vaccinating his children was applied by him to his cattle. Crucially, the disease was still interpreted wholly through the lens of humoral theory, encompassing not only the non-naturals, which can disrupt the equilibrium of humours, but also a 'contagious substance' that can multiply and subsequently disturb the balance of bodily fluids.

In addition, his chronicle shows that De Jong's contemporaries were familiar with the idea that the disease was also caused by a 'contagious substance'. Unlike during the time of Lustigh's chronicle, written over a century earlier, this could be experimentally validated in the nineteenth century. New practices such as inoculation and especially vaccination – since Edward Jenner's discovery in 1796 – enabled diseases to be understood in novel ways, although largely within the existing humoral theory of Galen.¹⁶⁶

With the availability of new information, knowledge, and medical practices, it thus became possible for chroniclers not only to challenge existing explanations but also to arrive at new interpretations that more closely corresponded to their observations. However, these new explanations did not supersede existing ones, as they continued to form part of the contemporary toolbox to understand and explain epidemics. Factors such as the weather, the corruption of organic matter, the role of miasmas, and disease contagion were all used to explain the origin and spread of the lung plague.

This means that better explanations not only require empirical validation to gain acceptance from non-experts, but also that traditional interpretations did not vanish instantly. In addition, to the emphasis on secular explanations, it is important to stress that at the same time De Jong also prayed to God to purify the contaminated air with lightning and thunder, so what we see in his chronicle is that 'traditional' and 'new' knowledge could comfortably coexist in people's minds.¹⁶⁷

Conclusion

In this chapter, we have discussed how various explanations could coexist, using epidemics as a case study. Knowledge about epidemics remained for a substantial part 'untight' throughout the early modern period. New theories could not always be (empirically) falsified and traditional explanations therefore remained part of the contemporaries' toolbox to explain what they experienced. This resulted not only in the coexistence of divine and natural explanations, but also in various types of natural explanations. In addition, we have seen that the relationship between these

¹⁶⁶ Lindemann, *Medicine and Society in Early Modern Europe*, 77; Jennifer D. Penschow, *Battling Smallpox before Vaccination: Inoculation in Eighteenth-Century Germany* (Leiden, 2021).

¹⁶⁷ De Jong, *De dagboeken (1825-1855) van Lieuwe Jans de Jong*, 210.

explanations changed over the long term and discussed the circumstances under which new knowledge was accepted.

From the sixteenth up to the nineteenth century, epidemics were interpreted as a collective punishment from God, but the way they were providentially interpreted changed. In particular, until the first half of the eighteenth century, chroniclers used biblical and historical examples to explain epidemics. References to the Old Testament played an important role, as did the combination of pestilence, famine, and war. The patterns they observed are as telling as the patterns that were absent. Epidemics were not interpreted as the end of times, but always as a divine test or punishment.

Consequently, religious measures such as prayer were not sufficient, secular measures were just as important. According to the chronicler Lustigh, for example, God gave humans the knowledge to stop epidemics. Therefore, the authorities were expected to take measures. Like their governments, chroniclers tried to determine how epidemics originated and how they spread. In doing so they used elements of Galenic medicine. Which elements were used depended on the epidemic, but also on the level of education and the socio-economic position of the chronicler. In other words, although knowledge, such as the Galenic medicine or the corpuscular theory of disease was available in early modern society, this did not mean that it was picked up by society at large. Therefore, it is necessary to focus on the cultural translation of knowledge and to examine which elements of a medical theory were appropriated, and under what conditions knowledge spread.¹⁶⁸

The corpuscular theory of disease, which was picked up by Lustigh but not by his neighbours, is a good example of new (expert) knowledge that circulated but was scarcely adopted by society. Two factors played an important role in this. On the one hand, the theory could easily be integrated into existing explanations, which makes it not distinctive enough. On the other hand, the 'particles' could not be observed, and thus the theory was purely hypothetical. Although one could argue that Lustigh's explanation better matched empirical evidence, that was not enough for its acceptance. Abandoning old ideas occurred almost exclusively when they could be refuted.

Around the mid-nineteenth century, we observed a diverse mix of explanations in the chronicles. Some of these were the same as in the sixteenth and seventeenth centuries.¹⁶⁹ Epidemics were interpreted as a punishment from God, yet unfolded through natural processes. Elements of Hippocratic and Galenic medicine, such as humoral theory and the influence of weather on the emergence and spread of diseases, played a significant role. Moreover, in contrast to the 1710s, the idea that diseases could also spread through pathogens was accepted following the invention of vaccination. The example of De Jong

¹⁶⁸ Lässig, 'The History of Knowledge', 29–58.

¹⁶⁹ For more information on the non-naturals in the eighteenth century, see: Kennaway and Knoeff, *Lifestyle and Medicine in the Enlightenment*.

suggests that chroniclers accepted this knowledge only when they understood and could empirically observe how diseases were transmitted through pathogens.

This means that with regard to medical knowledge, *content* and *direct* biases played a crucial role in the acceptance of new knowledge, as was the case with the meteorological phenomena in the previous chapter. Religious explanations continued to play an important role for the chroniclers, which shows that they could operate in several cultural systems at once.¹⁷⁰ What we might perceive as contradictions and inconsistencies caused no difficulty, and also did not obstruct the acceptance of new knowledge. Yet, a process of cultural translation did take place, in which expert knowledge was adapted and applied by non-experts. This chapter has shown how chroniclers did this, and that the chronicle is therefore a valuable source for analysing this process.

Finally, we observed some significant changes in the way chroniclers wrote about epidemics around the second half of the eighteenth century. Analogies with historical and biblical events receded into the background, and chroniclers increasingly began to compare the spread of epidemics with earlier periods using newly available demographic data.¹⁷¹ The next chapter discusses how this new practice emerged, and how existing explanations were confronted with new empirical observations.

¹⁷⁰ Swidler, *Talk of Love*, 94.

¹⁷¹ Among scholars this changed around 1650. Since then Nature was still regarded as a revelation of God, but it was no longer the analogy with biblical passages, but increasingly the order and structure of the creating itself, that were signs of his almightiness. See: Jorink, *Reading the Book of Nature*, 30.

